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Geology of the Farrington Lake Area, District of Kenora.

by

J.R. Trusler

1982

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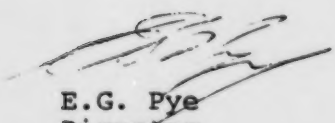
PREFACE

FARRINGTON LAKE AREA

The Savant Lake - Sturgeon Lake region has been prospected for precious metals since the turn of the century, and contains numerous occurrences of gold, copper, lead, zinc, silver, iron and molybdenum. In 1968, the Ontario Department of Mines and Northern Affairs, recognizing the mineral potential of the region and the reconnaissance nature and patchy distribution of previous geological work, initiated a series of detailed mapping projects to provide a more effective basis for determining the region's mineral potential and for guiding exploration. The discovery in 1969 of a base metal sulphide deposit in the Sturgeon Lake area reinforced this course of action. The survey of Farrington Lake Area covered by this report represents part of this series.



E.G. Pye
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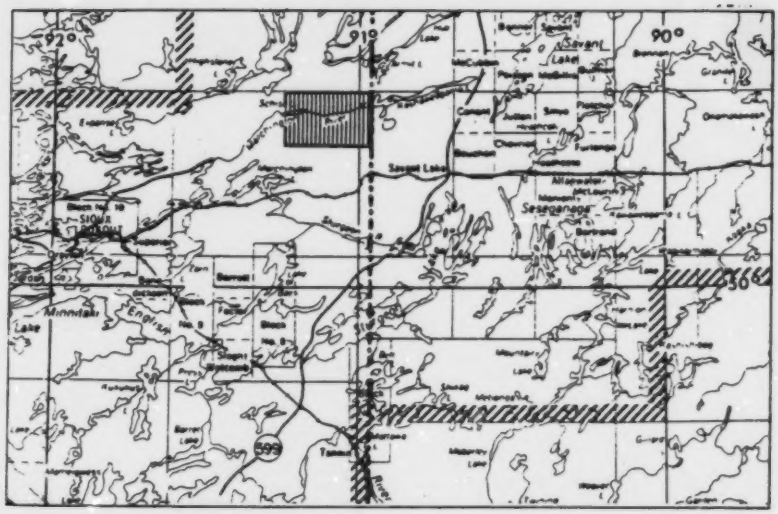

Scale: 1 inch to 25 miles

Figure 1: Key Map

GEOLOGY OF THE FARRINGTON LAKE AREA, DISTRICT OF KENORA

by

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[1]Geologist, Precambrian Geology Section, Ontario Geological Survey, Toronto. Manuscript accepted for publication by Chief Geologist, Ontario Geological Survey, August 18, 1981.

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Geology of the Farrington Lake Area, District of Kenora

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ABSTRACT

The Farrington Lake map-area is situated north of the community of Savant Lake area approximately 240 km north-northwest of Thunder Bay. The map-area forms part of the Wabigoon Belt, a part of the Superior Province in the Precambrian Shield. All the bedrock is Early Precambrian (Archean) in age. The map-area is underlain by two contrasting metavolcanic sequences, associated metasediments and mafic and felsic intrusive rocks of various ages.

The oldest rocks in the map-area are a sequence of massive and pillowed mafic metavolcanics, and are typical of the stratigraphically lower part of many Archean volcanic sequences. These rocks occur between Farrington and Lewis Lakes and within granitic rocks north of the Marchington River. The second sequence lies in an east trending unit between the south end of Farrington Lake and the middle of Fairchild Lake. This sequence is predominantly

metavolcanic marked by sharply contrasting interlayered, and interfingering felsic, intermediate, and mafic volcanic rocks. The bulk of these rocks are pyroclastic in origin.

Metaconglomerate, exposed along the northern shore of Schist Lake, Fairchild Lake and the Marchington River, is in fault contact, for most of its extent, with a metamorphosed trondhjemite to the north. Possibly enhanced by contemporaneous development of the Kashaweogama Lake Fault, as a driving mechanism, debris, from erosion of the trondhjemitic batholith, was deposited as coarse angular boulders and cobbles with a feldspathic lithwacke matrix. The metaconglomerate is succeeded by and intercalated with a south-facing sequence of metamorphosed metasediments including cherty siltstone, siltstone and feldspathic lithwacke. Silty magnetite ironstone and separate carbonate beds are present rarely within the siltstone near its base. The fine to medium grained metasediments are interlayered and intercalated with the upper metavolcanic sequence.

Felsic intrusive rocks of two ages occur in the map-area the older unit forms sheet-like batholiths of predominantly trondhjemitic composition with lesser granodicrite and quartz monzonite, is strongly metamorphosed, intrudes the lower mafic metavolcanic sequence, and is older than the upper metavolcanic sequence and metasediments. The younger unit forms circular to elliptical stocks of granite, quartz, monzonite and granodicrite composition, is weakly metamorphosed, and intrudes all other rocks in the map-area. A

differentiated mafic stock east of Farrington Lake and several mafic sills intrude the upper and lower metavolcanic sequences.

A major east trending syncline is inferred to approximately bisect the supracrustal rocks in the map-area. This fold coincides with the earliest observed folding in the area. The entire map-area is on the western limb of a northeasterly trending antiform to the east. This latter fold is superimposed on earlier folding. In the map-area, minor outcrop scale Z-folds coincide with this second period of folding. The Kashawegama Lake Fault which trends east along the northern shore of the Marchington River System separates a trondhjemite batholith on the north from metaconglomerate on the south. This fault was active during accumulation of conglomeratic metasediments and possibly accommodated subsidence of the metavolcanic-metasedimentary basin. The fault movement ceased prior to metamorphism of the trondhjemite batholith.

Past exploration in the area has not met with encouraging results. However, potentially significant zinc and copper occur in a zone of intercalated tuffs and siltstones. Coarse felsic pyroclastic rocks favorable for base metal mineralization occur in one area hidden beneath up to 60 m of sand. Success here in locating base metal deposits may depend on the use of deep penetration geophysical methods.

INTRODUCTION

Farrington Lake is situated approximately 240 km north-northwest of Thunder Bay. The map-area is bounded by Latitudes 502542N and 501800N and Longitudes 911500 and 905752 and comprised about 250 km2. Farrington Lake empties into the Marchington River which divides the map-area roughly in half on an approximately east-west line. The present survey was conducted during the field season of 1974.

The Marchington River forms part of a navigation route linking the southern part of northwestern Ontario to the Albany River which drains eastward into James Bay. The route was used extensively by early explorers and fur traders and is currently popular among canoeists. Intermittent prospecting has occurred in the area. The most recent interest has been stimulated by the discovery of a Cu-Pb-Zn-Ag sulphide ore body by Mattagami Lake Mines Limited Exploration Division in the Sturgeon Lake area. The Savant Lake greenstone belt underlies part of the map-area and is continuous with the Sturgeon Lake greenstone belt to the south.

PRESENT GEOLOGICAL SURVEY

Mapping was done by pace and compass traverses at 0.4 km intervals, supplemented by the use of vertical air photos at a scale of 1:15 840. Based upon prior examination of air photos, traverses were designed for optimum outcrop coverage, and where possible, at or near right angles to the known trend of the units indicated on existing

geological maps and ODM-GSC Aeromagnetic Maps (ODM-GSC 1961a and b). Where outcrop areas were readily apparent on the air photos, these were mapped directly on the photo overlay. Outcrops that are not visible on the air photographs were tied to recognizable topographic features by pace and compass traverse lines wherever feasible. In addition all shorelines of lakes and rivers were investigated for outcrops. Emphasis was placed on mapping the metavolcanic areas; a minimal amount of time was spent on the areas underlain by granitic rocks. Geological data were plotted on transparent overlays attached to the air photographs and were subsequently transferred to a base map prepared from the Forest Resources Inventory base maps, Ontario Ministry of Natural Resources, Division of Forests.

A preliminary uncoloured geological map (Trusler 1975) with marginal notes was published at a scale of 1:15 840 in 1975. The final map accompanying this report is modified from the preliminary map and is at a scale of 1:31 680.

ACKNOWLEDGMENTS

The author acknowledges the assistance of J.R. Howarth, B.J. Paul, P. Puodziunas, and S. Mole during the 1974 field season. J.R. Howarth, as senior assistant, was responsible for about 45% of the mapping. B.J. Paul and P. Puodziunas performed independent mapping in about 5% of the map-area.

Previous mapping to the east by W.D. Bond and discussions with W.D. Bond greatly aided this survey and report.

MEANS OF ACCESS

Farrington Lake is situated 16 km north and 24 km west of the town of Savant Lake, at the junction of the transcontinental line of the Canadian National Railway and Highway 599. Highway 599 originates 1.6 km east of the town of Ignace 240 km west of Thunder Bay on the Trans-Canada Highway. From Ignace, Highway 599 runs northeasterly to the Town of Savant Lake 129.6 km to the north, and continues northward to Pickle Lake. The Marchington River Road, built subsequent to this survey, connects Sioux Lookout to Highway 599 at a point approximately 32 km north of Savant Lake. The Marchington River Road traverses the southern part of the map-area, entering the eastern boundary approximately 30 km from its terminus on Highway 599. The road crosses the eastern boundary of the map-area 2.4 km north of the southeast corner, passes between Farrington and Lewis Lakes and crosses the western boundary approximately 0.8 km north of the southwest corner. The road now provides excellent access to the lower half of the map-area.

The Marchington River provides good canoe access to the middle of the map-area, along an east-west line, and to the southeast corner via Farrington and Lewis Lakes. The northern portion of the map-area is most readily reached from the Marchington River, except in the

northwest where Runway Lake provides good access by fixed-wing aircraft. The Marchington River and Farrington Lake - Lewis Lake - Tawatinaw River routes are often used by canoeists. As of 1974, portages are maintained in good condition by the Ministry of Natural Resources. From the east end of Schist Lake there are five short portages on the Marchington River to Fairchild Lake and Farrington Lake. In a west to east progression the length of these portages are respectively 250 m, 50 m, 150 m, 120 m, and 150 m. The portage connecting Farrington and Lewis Lakes is 1120 m. This portage is bisected by the Marchington River Road.

PREVIOUS GEOLOGICAL MAPPING

Geological investigations in the Savant Lake area were initiated in the early part of this century, but most studies have been carried out to the east of the present map-area. Bond (1974, 1977, 1979) describes this early work to the east. Moore (1910) visited the area in 1909 to evaluate the iron deposits, and published a map at a scale of 1:126 720. Preliminary Map P.54 (Hudec 1959) at a scale of 1:63 630 includes a small area in the northwest sector of the present map-area. R. Skinner (1969) mapped the area at a reconnaissance scale of 1:253 440 in order to correlate the surrounding greenstone belts. J.C. Davies et al. (1970) published a compilation map (Map 2169) at a scale of 1:253 440 that includes the present map-area. The area adjoining the east boundary of the map-area was mapped in detail by Bond (1974). Synoptic studies by Sutcliffe in Trowell et al. (1977)

and Breaks et al. (1978) included parts of the present map-area.

MINERAL EXPLORATION

The Savant Lake region has been prospected for precious metals since the turn of the century. Iron deposits in the early part of the century and gold in 1926, were discovered east of the map-area.

Since the mid-1950s, emphasis in exploration has shifted from precious metals to base-metal deposits. The discovery of the Mattabi Mine on nearby Sturgeon Lake in 1968 reactivated interest in the area, and exploration activity intensified from 1969 to the present.

TOPOGRAPHY, DRAINAGE AND MORPHOLOGY

Fairchild and Farrington Lakes have an elevation of approximately 390 m. Schist Lake has an elevation of approximately 384 m. The surrounding terrain rises a maximum of 60 m above the lakes with local relief generally less than 30 m.

Topographic features reflect diverse origins. Quaternary glaciers scraped all of the weathered surfaces of rocks from the area. However, the only topographic feature which may, partly or entirely, be due to glacial scouring is the general north-south alignment of Farrington and Lewis Lakes. However, the bedrock control of the east and west shore indentations on both lakes suggests that even this was

a pre-glacial erosional feature. Deposition of glacial sediments, however, had a strong influence on topography and drainage. A southwesterly trending esker delta complex traverses the middle of the map-area. This feature averages 3 km in width, is generally flat on top and a few rounded marginal kames and several small ice depression features up to 20 m deep are present. Shorelines of several lakes and bays are formed against the esker delta. Drive Lake and Tripoli Lake are believed to be depressions left by thicker sections or lobes of the ablating ice sheet. South of Schist Lake near its western end a kame moraine forms high rounded hills with 20 m local relief. A type of recessional moraine called rib moraine by Zoltai (1965) occurs in the map-area adjacent to the esker delta on both sides north of the Marchington River and east of Farrington Lake. In all, approximately 50 km2 of the map-area exhibits this feature. Characteristically the moraine comprises semicontinuous east-west ridges 4 m high and 20 to 30 m wide, approximately 40 m apart. The valleys between the ridges are generally wet and poorly drained. The general mantle of sandy till throughout most of the remainder of the map-area has the effect of reducing local relief.

The remaining topographic features in the area including the Marchington River and Runway Lake are bedrock controlled. The supracrustal rocks generally form low rounded outcrops with linear incisions coinciding with more easily eroded units. A gabbroic stock in the southeastern part of the map-area forms high rounded hills with a local relief of 50 m. The granitic rocks north of the

Marchington River form low elongated ridges. Granitic rocks south of Schist Lake form a plateau with 50 m relief of rounded outcrops and local relief of 5 to 10 m.

Drainage is generally poor with extensive low wet areas of muskeg east of Farrington Lake, north of the Marchington River and west of Lewis Lake. The esker delta complex, however, forms a large area of groundwater recharge. All lakes and rivers in the area feed the Marchington River which is part of the English River Drainage Basin which drains westward to Lake Winnipeg.

NATURAL RESOURCES

A dense mixed growth of spruce, pine, poplar and balsam dominates the vegetation. Spruce is the most plentiful tree and reaches its greatest height in areas on the edge of and marginal to the esker delta. Pine are found in abundance in dry sandy areas such as the kame moraine and esker delta complex. Minor birch, mountain ash and maple are found on the edge of sandy areas. Arbor vitae and alder dominate the low wet areas.

At the time of mapping no modern logging operations had been carried out in the area.

Pike and yellow pickerel thrive in the lakes and rivers of the map-area. A few fishermen travel the Marchington River.

Moose, black bear, muskrat, beaver, red fox, rabbit, mink, weasel, ground hogs, raccoon, red and grey squirrels and other small rodents were seen in the area in the 1974 field season.

GENERAL GEOLOGY

EARLY PRECAMBRIAN (ARCHEAN)

All rocks underlying the map-area are of Early Precambrian (Archean) age. In the map-area, there are two volcanic sequences.

Mafic metavolcanics are apparently the oldest rocks in the map-area and are found in a north facing east-trending sequence between Farrington and Lewis Lakes. Screens and xenoliths of mafic rock within granitic plutonic rocks to the north of the Marchington River are believed to correlate with the lower mafic metavolcanics. The maximum apparent thickness measured near the eastern terminus against a metagabbro is approximately 1600 m. The presence of pillows and intercalated metagreywacke indicates that these rocks were primarily deposited in a subaqueous environment.

Early granitic batholiths, in the north, to the north of the Marchington River, and in the south, at Lewis Lake, are of trondhjemitic to granodioritic and quartz monzonitic composition.

Conglomeratic metasediments are separated from the granitic plutonic rocks to the north of the Marchington River by the Kashaweogama Lake Fault through most of the area. However, some of the metaconglomerate is situated north of the fault on the north shore, and, although highly deformed, appears to unconformably overlie the granitic plutonic rocks.

Finer grained clastic metasediments are intercalated with and overlie the metaconglomerate along the Marchington River. The clastic metasediments face south and grade from siltstone interlayered with chert to siltstone interlayered with tuff and minor magnetite ironstone[1] to feldspathic lithwacke at the top of the sequence.

[1]The term ironstone is used here as defined in the unpublished classification manual of the Ontario Geological Survey, issued 1978: a chemical sedimentary rock that contains 33 percent or more of the common iron minerals by volume. This definition excludes other chemically precipitated sediments such as chert, and clastic sedimentary material that are commonly interlayered with ironstone.

A mixed sequence of felsic to mafic metavolcanics is intercalated with and overlies the clastic metasediments also along the Marchington River. Here the metavolcanics face south. Further to the south, as determined at Farrington Lake, all tops indicate a north facing for the mixed sequence.

A younger felsic plutonic batholith south of Schist Lake comprises granite, quartz monzonite and granodiorite, and a smaller stock, at Water Lake, comprised of hornblende quartz-monzonite to hornblende-biotite granodiorite, intrudes the earlier Lewis Lake Batholith.

A large metagabbro body east of Lewis Lake appears to intrude the lower mafic metavolcanics and felsic metavolcanics of the later composite metavolvanic sequence. Quartz monzonite cuts the metagabbro. The relative age of the metagabbro is unknown, but its age relative to the lower mafic metavolcanic unit suggests a co-magmatic relationship.

The entire supracrustal sequence appears to be folded about a major east-trending synclinal axis which cannot be accurately located. The only indication of this is several opposing facing determinations in the mixed metavolcanics.

The zone of middle to upper greenschist facies metamorphism narrows from a maximum width of 3600 m on the east side of the map-area to 750 m on the west side. This zone lies immediately adjacent to and to the south of the Kashaweogama Lake Fault. The remaining supracrustal rocks in the area exhibit almandine-amphibolite facies metamorphism.

The Table of Lithologic Units is given in Table 1. Previous workers (Moore 1928; Rittenhouse 1936; Skinner 1969) established the main geological units and devised their own nomenclature for the various

lithologic units. Table 2 summarizes each of their main sequences and the previous terminology.

METAVOLCANICS

In the field, the metavolcanics were subdivided into three groups based on colour index, (mafic mineral volume percent content). The three groups are:

1) mafic metavolcanics having basaltic composition +40

2) Intermediate metavolcanics having an ardesitic composition +20-40

3) felsic metavolcanics having a rhyolitic composition, +20

Some units which displayed mixtures of felsic and intermediate metavolcanics were also distinguished.

LOWER MAFIC METAVOLCANICS

The lower mafic volcanic rocks summarized in Table 2 are suggested to correlate with the "Jutten Volcanics" as subdivided by Rittenhouse (1936) in his mapping to the east of this area. Moore (1910, 1928) classified these as Keewatin greenstones the basal member of his "Savant Group". In a like manner Skinner (1969) included all metavolcanics and metasediments in the Savant Group and called the

basal member "Greenstone".

The mafic metavolcanic belt extends east-west for a total strike length of 11 km, and at a maximum is 1600 m thick. The mafic metavolcanics are well exposed immediately west of the south end of Farrington Lake for about 6 km along strike. The mafic unit thickens to the east and terminates abruptly against a metagabbro stock in the southeastern part of the map-area. The contact between the two rocks is not exposed. The mafic metavolcanics are in fault contact with granitic batholith rocks to the south. The contact with the felsic metavolcanics immediately to the north is not exposed. Plots of foliations from these two units display an average 6 degrees difference in attitude. Since the felsic metavolcanics are largely distal tuffs initial volcanic slope should not contribute to this strike difference. Therefore the difference in attitude may be a discomformable boundary between the two units. The western end of the mafic metavolcanic unit is intruded by a granitic batholith south of Drive Lake. Screens and xenoliths of mafic material continue from this western terminus of the mafic metavolcanic belt in a narrow zone approximately 400 m wide which also separates the granite to the north from quartz monzonite and granodiorite to the south.

The mafic metavolcanics are fine to medium grained, dark green on the weathered and fresh surfaces, and strongly foliated. Flows appear to constitute approximately 85 percent of the rock unit. Tuffs (10 percent) and pillow lavas (5 percent) are also evident. Although

several flow contacts were seen, the thickness of individual flows could not be determined. Phenocrysts, amygdules and vesicles were not seen. The strong metamorphic fabric and stretching of recognizeable pillows (from 2:1 to 15:1) suggests that pillow lavas may comprise a larger proportion of these mafic metavolcanics than is evident in the field. Bond (1976, 1979) found that pillow lavas comprise the bulk of the Jutten mafic metavolcanics, but also found porphyritic flows and crystal tuffs. In the map-area the mafic tuffs are devoid of primary textures but are thinly laminated.

The mafic metavolcanics have been regionally metamorphosed to the almandine-amphibolite facies. In thin section, no variation was seen in the mineralogy of the mafic metavolcanics. Thin laminations in the mafic tuffs are the only textural variation. Hornblende, oligoclase (An 25-30), quartz and almandine are the essential minerals. Magnetite, ilmenite, leucoxene and minor pyrite are the accessory minerals. The strong parallel alignment of hornblende and aggregates of felsic minerals is evident in thin section. Grain size varies from 0.01 to 0.4 mm. Hornblende is euhedral, elongated 4:1, generally displays good cleavage and exhibits dark green pleochroism. Quartz and feldspar are anhedral, forming streaks and lenses of granular aggregates. Albite twinning is rare, but the felsic minerals may be readily distinguished by different refractive indices.

No chemical analyses were made of the mafic metavolcanic. Bond (1976, 1979) indicates that the Jutten mafic metavolcanics are tholeiitic.

Pillow size, and the lack of phenocrysts and amygdules suggest an identical chemistry in the map-area.

PILLOWED FLOWS

Pillow lavas are recognizable over short lateral distances of 100 to 200 m, in the middle of the mafic metavolcanic belt west of the south end of Farrington Lake. The pillows are consistently dark green and are more resistant to weathering than the slightly lighter coloured selvedge. Individual pillows where not severely deformed average 1.0 to 1.5 m in size and are 0.3 to 0.6 m thick in cross-section. Pillows are generally bun shaped and tightly packed although a few large elliptical pillows were seen. Mildly distorted pillowed flows do not persist laterally. Due to intense deformation many of these units were found to grade rapidly into zones of 15:1 strike length to cross section thickness over a distance of 50 to 100 m to a point that the pillowed flows could no longer be distinguished from other flows. In all cases the facing indicated by pillows is north.

INTERLAYERED METASEDIMENTS

Two zones in the lower mafic metavolcanic belt contain 2 and 3 units respectively of felsic rock 3 to 6 m thick, separated by mafic tuff 1 to 3 m thick. The rock is massive to slightly foliated, fine grained, buff weathering, and light grey on the fresh surface. Trusler (1975) called this rock a massive sandstone. The rock is conformable with

the mafic metavolcanics, but otherwise no primary internal textures or boundary relationships were detected in the field. The felsic minerals constitute from 80 to 90 percent of the total rock. Biotite constitute the mafic portion of the rock.

In thin section relict textures not seen in the field are evident. The rock is metamorphosed to the middle greenschist facies. Biotite, quartz, albite, epidote and carbonate are the metamorphic minerals. Biotite, in individual grains, rims rounded to subangular aggregates of quartz and albite. The crystal aggregates generally measure .1 to .5 mm in diameter. Individual crystals measure 0.03 to 0.3 mm in diameter. Quartz and albite are both anhedral and exhibit a granular texture. Minor saussurite alteration of the plagioclase aids in identification of this mineral. Minor subhedral carbonate also occurs between or marginal to albite grains. Epidote occurs as anhedral granular masses and as single subhedral crystals within some of the albite-quartz aggregates. A few relict plagioclase laths were seen in thin section. These had long dimensions of 0.3 to 0.4 mm and length to width ratios of 3 and 4 to 1. Although considerably clouded with epidote extinction angles were obtained in two cases yielding values of An28 and An35. These relict plagioclases occur within the albite-quartz aggregates having feather-like boundaries with the metamorphic minerals at the ends of the laths.

In the three thin sections observed the average composition is as follows: quartz 35 percent; albite 45 percent; biotite 10 percent;

epidote 5 percent; relict plagioclase 1 percent; carbonate 1 percent, and saussurite 3 percent. The composition and juxtaposition of this rock within the mafic metavolcanics poses a problem. The relict grain boundaries and plagioclases and massive nature of this rock suggests that it is a massive lithic wacke.

MAFIC AND ULTRAMAFIC SCREENS

North of the Marchington River on the north side of the Kashaweogama Lake Fault several xenoliths and screens of mafic rock are present. One screen of ultramafic rocks is also present on the northwestern shore of Fairchild Lake near the northeastern corner of the map-area. This mafic rock is metamorphosed to the amphibolite facies. No chemical or thin section work was done on this rock. They are mentioned within the context of the lower mafic metavolcanics due to the probable correlation of these units. Two thin sections were cut off the ultramafic rocks.

The mafic rocks enclosed by the granitic rocks from Fairchild Lake westward to Runway Lake occupy 7 percent of the outcrop in this area. Assuming a proportional volume in unexposed areas the total areal coverage would be approximately 6.2 km2. The mafic rock is dark green on the weathered surface and black on fresh surfaces, medium to coarse grained and strongly foliated. It is entirely devoid of recognizeable primary features.

Bond (1974) found a north facing sequence of mafic metavolcanics on the north side of the Kashaweogama Lake Fault east of the present map-area which he correlated with the Jutten volcanics. Hudec (1959) recorded the association of ultramafic rocks and mafic metavolcanics in the vicinity of Armit Lake immediately north of Fairchild Lake and to the north of the map-area. Sutcliffe (1977) confirmed this association and suggested the abundance of ultramafic rocks is greater than previously noted. He correlated the mafic metavolcanics in the Armit Lake area with those north of Kashaweogama Lake suggesting that the Armit Lake sequence is the lowest exposed section of the Jutten volcanics noted to date. The proximity of these rocks to the map-area and the mafic-ultramafic association suggest that the contained screens and xenoliths of similar composition within granitic rocks north of the Marchington River are correlativefrom the Jutten volcanics.

One of the ultramafic rocks in the map-area is a serpentinite whereas the dominant mineral in the ultramafic outcrop on Fairchild Lake is talc. The serpentinite has a black spotted rusty buff weathering surface and is dark greenish black on the fresh surface. A smal zone of polygonal jointing about 8" in cross section and larger massive zones were seen in outcrop. In thin section the serpentinite contains antigorite 70 percent, talc 25 percent, pyrrhotite 2 percent and ferrochromite 3 percent. The antigorite occurs as a continuous matte of blades containing subrounded mattes of talc in what appears to be a relict poikilitic texture. Antigorite also occurs frequently as the

core of the talc mattes. The talc mattes are 0.9 mm in diameter. Subhedral ferrochromite grains occur on the edge of the talc clusters. Pyrrhotite occurs within the antigorite matte.

The talc-dominated outcrop also displays similar polygonal jointing, but several shear zones contain 1 to 3 cm layers of tremolite in talc. The rock is medium grained and light bluish grey on the weathered surface and light greyish white on the fresh surface. In thin section the components are talc 90 percent, serpentine 9 percent, ferrochromite 1 percent. Anhedral talc crystals 2.3 mm in diameter contain parallel clusters of antigorite 0.3 mm in diameter and individual blades of antigorite on the margin. A fracture cleavage separates the talc crystals in rows with very fine talc crystals aligned parallel in the fractures. Ferrochromite occurs evenly distributed throughout as 0.01 mm anhedral crystals. A whole rock analysis of this rock appears in Table 3.

SUMMARY

The accumulation of the mafic metavolcanics in the map-area between Lewis and Farrington Lakes probably took place under uniformly quiet, relatively deep, subaqueous conditions, because of their uniformity of feature and composition, absence of intercalated locally derived metasediments, presence of pillow lavas and lack of amygdules or vesicles. The nature of the volcanism is typical of a "lower" mafic volcanic unit that is observed in many Archean greenstone belts and

has been classified by previous authors as the Jutten volcanics further to the east.

Mafic rocks enclosed by granitic rocks north of the Kashaweogama Lake Fault correlate with the Jutten volcanics and with mafic and ultramafic rocks near Armit Lake to the north of the map-area.

FELSIC, INTERMEDIATE AND MAFIC METAVOLCANICS

Felsic, intermediate and mafic metavolcanics occur in a belt that is 5.0 km wide at the east end of the map-area and which thins westward along the Marchington River to 0.3 km wide at the western edge of the map-area. Moore (1928) incorporated these metavolcanics and interlayered metasediments into his "Savant Group" (Table 2). Ritterhouse (1936) renamed the metavolcanics the "Handy Lake Volcanics". Skinner (1969) retained Moore's original term. Bond (1977, 1979) worked out the stratigraphic relationships in detail, but resisted the temptation of stratigraphic nomenclature.

Along the Marchington River the felsic, intermediate and mafic metavolcanics face south, overlie the metaconglomerate, and are intercalated with and overlie the metamorphosed siltstones and feldspathic lithwackes. The best exposures south of the Marchington River are on the north shore of Farrington Lake where the metavolcanics face north. No accurate position for the synclinal axis was determined or estimate of thickness was possible. The upper

sequence of metavolcanics is apparently underlain by the Jutten volcanics in the south near the southern tip of Farrington Lake. Statistical analysis of foliations discloses a 6 degree disparity in mean attitude of these two units of volcanic rocks. The basal member of this upper metavolcanic sequence, a dacite crystal tuff, appears to be partially interrupted by a metagabbro stock between Farrington Lake and the eastern boundary of the map-area. No contact was seen in the field between these two rock types and it remains questionable whether the metagabbro intrudes the upper metavolcanic sequence.

The mafic metavolcanics of the upper metavolcanic sequence occur close to the Marchington River and are readily distinguishable from the felsic and intermediate metavolcanics. The felsic and intermediate metavolcanics, are predominantly pyroclastic and distinction between these units in the field was frequently complicated. Gererally tuff, crystal tuff and less frequently lapilli tuff are interlayered within intervals of less than 15 m. Due to this limit in thickness, many units could not be represented at the present map scale, and it is also likely that the lithology shown on individual outcrops may not be representative of the lithology of the surrounding drift covered bedrock. For the purpose of this report the felsic and intermediate metavolcanics are discussed as one entity and the mafic metavolcanics of the upper metavolcanic sequence are discussed as a separate entity.

MAFIC METAVOLCANICS OF THE UPPER METAVOLCANIC SEQUENCE

Mafic metavolcanics of the upper metavolcanic sequence are largely fine to medium grained chloritic flows, but mafic tuffs gradually become more prominent towards the western part of the map-area. Locally the flows are amygdaloidal.

Three mafic units in the upper metavolcanic sequence were mapped in the field. The basal unit of the upper metavolcanic sequence is 500 m thick at the eastern boundary of the map-area where it occurs on the south shore of Fairchild Lake. Outcropping along the Marchington River, it pinches out near the middle of and just south of Schist Lake. It is intercalated with the metasiltstones in the western half of the map-area and with intermediate metavolcanics near the eastern boundary of the map-area. The unit is fine grained and porphyritic flows, locally amygdaloidal with minor tuffaceous units especially where it pinches out in the west. In thin section the matrix of the rock is fine grained (0.04 mm). Contained minerals include albite, epidote, chlorite, carbonate, magnetite and pyrite with minor quartz or serpentine (antigorite).

Amygdules are 1 mm by 3 mm lenses filled with euhedral albite and carbonate mosaics. Individual crystals measure 0.2 mm in various thin sections. In porphyritic sections the relict feldspar phenocrysts are clouded by epidote and saussurite and measure up to 2 mm in diameter. The original arrangement of these phenocrysts was not possible to determine. This mafic unit has evidently been metamorphosed to the

lower to middle greenschist facies.

Four analyses (sample numbers 40025, 40033, 40108, 40115) of this rock unit (Table 3) suggest that it is a tholeiitic basalt.

The second major mafic unit crosses the eastern boundary of the map-area 1.5 km south of Fairchild Lake and extends westward to within 1 km of the western boundary of the map-area. It attains a maximum width of 750 m and is intercalated west of Farrington Lake with intermediate and felsic metavolcanics. The northern boundary of this unit overlies metamorphosed felsic lithwacke along the Marchington River where the unit faces south. A pillowed outcrop of this unit on the west shore of Farrington Lake faces north. The writer believes that a major east trending synclinal axis with a horizontal to east plunging axis is contained within the mafic unit between these two points. The mafic metavolcanic unit is comprised predominantly of massive to porphyritic flows in the eastern two-thirds of the map-area and tuff in the western third of the map-area. Rare amygdaloidal parts were seen and minor pillowed volcanic rocks are present near Farrington Lake. Few thick massive flow units are present, several flow contacts were seen in the field. The mafic metavolcanics weather greyish green and are dark greyish green on the fresh surface. In the eastern two-thirds of the map-area this unit is metamorphosed to the middle greenschist facies but crosses the transition zone into almandine-amphibolite facies south of and 1 km east of the east end of Schist Lake.

In thin section several specimens metamorphosed to the lower to middle greenschist facies were found to be porphyritic. Minerals common to all sections are: chlorite, albite, epidote, carbonate, ilmenite and leucoxene. Minerals found in certain sections include sphene and uralite and pyroxene. In general the grains in the matrix range from 0.02 to 0.03 mm and the phenocrysts 0.2 to 1.5 mm in diameter. In one section subhedral plagioclase relicts gave values of An34. Cataclasis of these phenocrysts was evident. Amygdules with twinned carbonate were found in two thin sections. The mafic rocks metamorphosed to the almandine-amphibolite facies were found to contain hornblende, carbonate, oligoclase, magnetite, ilmenite, leucoxene and minor epidote. No porphyritic textures or any primary textures were found in this latter group of rocks. Grain size generally varied from 0.02 to 0.05 mm Euhedral, green pleochroic hornblende is contained in parallel alignment within a mosaic matrix of carbonate and plagioclase.

Five partial analyses of this unit indicate that it is a high alumina calc-alkaline basalt containing minor tholeiitic basalt. Table 4 contains the analyses of this rock unit (sample numbers 40022A, 40022B, 40041, 40210, 40303, 40386).

The third mafic unit occurs near the western end of the map-area 200 m south of Schist Lake. Only two small outcrops occur in this unit. Weathering dark green and greenish black on the fresh surface the two

outcrops are both fine grained tuffs. A partial analysis of a specimen from one of these outcrops indicated that the rock is an alkaline-olivine basalt. The possible presence of chemical sediments and the almandine-amphibolite facies metamorphism may be complicating factors here. The analysis appears in Table 4 (sample number 40382A).

FELSIC AND INTERMEDIATE METAVOLCANICS

In the field the felsic and intermediate metavolcanics were subdivided into intermediate (20 to 40 percent mafic minerals) and felsic (less than 20 percent mafic minerals) varieties based on colour index. Some units appeared to overlap the felsic/intermediate subdivision. These were found to be dacites by chemical analyses and thin section investigation.

Metavolcanics which have been classified as intermediate (andesitic) in composition have grey-green to buff weathered surfaces and are generally grey on the fresh surface. The intermediate metavolcanics are mainly pyroclastic (70 percent), consisting of tuff and minor lapilli-tuff; intrusive phases related to the volcanic sequence are common (20 percent); and flows are relatively rare (10 percent). Crystal fragments of feldspar and to a lesser extent quartz are very common in the tuffs in the area. Since the flows and intrusive rocks are also porphyritic, difficulty was encountered in distinguishing these from the tuffs.

An east-trending unit of lapilli-tuff of intermediate to felsic composition is present on the eastern boundary of the map-area 3 km south of Fairchild Lake which pinches out 11 km to the west. At its maximum the unit is 230 m thick.

Immediately to the south of the fragmental unit a 2100 m thick zone of intermediate metavolcanics underlies the map-area for a length of 14 km These rocks are generally porphyritic and fragmental in appearance and are metamorphosed to almandine amphibolite facies rank. Some of the outcrops were identifiable as tuffs or flows, but a precise determination of the origin could not be made on most of the exposures in this zone. Partial analyses of this rock unit appear in Tables 5, 6, 7 and 8.

The felsic metavolcanics weather creamy pink and exhibit pink to grey fresh surfaces. Most of these rocks are calc-alkaline rhyolites. The felsic metavolcanics are thought, by the author, to be predominantly tuffs (90 percent) with minor sills and dikes (10 percent). No definite felsic flows were recognized.

A felsic metavolcanic unit extends into the map-area from the east, 2.4 km south of Fairchild Lake, and appears to pinch out on the western shore of Farrington Lake. The unit is 1600 m thick at the eastern boundary of the map-area as determined by Bond (1974).

A felsic crystal tuff unit extends into the map-area from the east,

0.8 km south of Fairchild Lake, and appears to grade into tuffaceous metasediments and intermediate tuff just west of Farrington Lake. The transition zone is largely obscured by the esker delta complex, but the presence of quartz crystals in the metasediments and similar texture in the felsic and intermediate crystal tuffs suggests that the interpreted transition is valid. Partial analyses of samples from the felsic unit appear in Table 9.

Dacitic crystal tuff extends from the eastern boundary of the map-area to at least 1.6 km west of Farrington Lake, and lies immediately north of the lower mafic metavolcanic sequence. Crystal fragments of quartz are usually present in varying amounts and feldspar crystal fragments are always present. Other fragments are generally angular and felsic; mafic fragments are scarce. This formation appears to grade into the andesitic metavolcanics to the north. Partial analyses of this unit appear in Table 10.

Three units of intermediate to felsic tuff and crystal tuff which appear roughly correlative with the felsic crystal tuff, but extend to the west from the more western of the two larger islands on Fairchild Lake, are very thin (about 130 m maximum thickness) and are intercalated with tuffaceous metasediments and mafic flows and tuffs. The most northerly of these units contairs local accumulations of lapilli-sized fragments.

Nine partial and three whole rock analyses of these units suggest

that the crystal tuffs grade compositionally from calc-alkaline dacite to calc-alkaline rhyolite in an east to west line. These analyses appear in Tables 11 and 12.

Additional occurrences of this rock type were sampled and the analyses appear in Table 13.

Due to similarities in texture the quartz and quartz-feldspar porphyry are easily confused with the crystal tuffs. Many of the rocks mapped as porphyry in the area may well be crystal tuffs.

In thin section tuffs and flows could not be distinguished as was the case much of the time in the field. All thin sections of felsic to intermediate metavolcanics observed are porphyritic. It is assumed that most if not all of these rocks are crystal tuffs. Feldspar phenocrysts in the andesite and dacite are generally euhedral to subhedral regardless of metamorphic facies attained. Where phenocrysts were not euhedral dynamic metamorphism (cataclasis) was found to be the cause. In both the andesite and dacites the plagioclase phenocrysts are generally highly saussuritized which is not the case in the rhyolites. Feldspar phenocrysts in the rhyolites are subhedral to anhedral as the rhyolite generally displays cataclasis evenly distributed throughout the rock compared to the zoning of this feature in dacite and andesite. Phenocryst size varies from 0.5 mm to 5 mm in all of these volcanic types but is normally constant in individual specimens. Most of the andesite specimens

contain 4 to 5 mm phenocrysts. Quartz phenocrysts in the dacite and rhyolite normally consist of aggregates of 4 to 8 quartz crystals per phenocryst. Quartz phenocrysts are subangular, appear to be of uniform size in each specimen, and are identical in size to feldspar phenocrysts in each specimen. Elongation ratios of plagioclase and quartz phenocrysts in all of these rock types are approximately 2:1.

Matrix of the andesites, dacites and rhyolites ranges in size from 0.01 mm to 0.05 mm Compositionally the matrix of the dacite and andesite are similar, if not identical. Zones of cataclasis, strong foliation of mafic minerals and mosaic texture of grains of uniform size are normally found in these two rock types. Rhyolites, in contrast, have less than 10 percent mafic minerals in the matrix material and are poorly foliated, have pervasive cataclasis and display a seriate texture.

Andesite and dacite specimens in each of the following metamorphic facies contained approximately the same proportions of matrix minerals: lower, middle and upper greenschist facies and almandine amphibolite facies. All rhyolite specimens observed are metamorphosed to the lower and middle greenschist facies. These assemblages are listed in Table 14.

SUMMARY

The upper metavolcanics comprise more than one partial cycle of the

basalt-andesite-rhyolite association. Tholeiitic basalt flows from the base of this sequence where it faces south along the Marchington River. The southern unit of the upper metavolcanics is a dacite crystal tuff which faces north. The dominant calc-alkaline portion of the upper metavolcanics is represented by basalt flows with minor andesite flows and to a greater extent thinly layered andesite, dacite and rhyolite crystal tuffs. The felsic and intermediate material of the sequence is probably all distal facies. The lower part of the upper metavolcanic sequence is intercalated with and overlies the metamorphosed siltstones and feldspathic lithwackes.

A major east-west synclinal axis is inferred to be contained within the upper mafic metavolcanic unit west of Farrington Lake. The absolute location of this fold axis has not been determined.

METASEDIMENTS

A polymictic conglomerate is exposed along Fairchild Lake, the Marchington River and Schist Lake. The conglomerate is characterized by leucotrondhjemitic cobbles and boulders, and is continuous with the conglomerate to the east described by Bond (1974). The conglomerate may be largely derived locally from the granitic rocks and may unconformably overlie them (Bond 1974); however, the conglomerate and granitic rocks are separated by a fault throughout most of the map-area.

Two distinct metasedimentary units separated by a mafic metavolcanic unit occur south of the conglomerate. Generally, from north to south these metasediments form a stratigraphic sequence of cherty siltstones succeeded upward by siltstone and feldspathic lithwacke. Tuffaceous zones are more commonly associated with the siltstone and cherty siltstone than with the feldspathic lithwacke.

CONGLOMERATE

Conglomerate has long been recognized as the most distinctive unit in the Savant Lake area, and has been prominent in past mapping (Moore 1928; Rittenhouse 1936; Skinner 1969; Bond 1974, 1977, 1979) and recent studies (Funk 1973, Sutcliffe 1977). The conglomerate east of the map-area has been divided into two distinctive parts based on composition of the clasts as follows:

1) Polymictic conglomerate with granitoid clasts equivalent to the lower conglomerate of Rittenhouse (1936); and

2) Polymictic conglomerate with volcanic clasts equivalent to the upper conglomerate of Rittenhouse (1936).

Only the first type is represented in the present map-area.

While it is generally established that the conglomerate unconformably overlies the lower metavolcanic units in the region (Jutten

volcanics), the source of the granitoid clasts and the tectonic implications are the subject of controversy. Funk (1973) believes that the granitoid clasts originate from sub-volcanic intrusions and Bond (1979) supports this view due to high normative quartz contents in the granitoid clasts. Sutcliffe (1977) presents the view from selective reconnaissance mapping that the clasts originate from trondhjemitic intrusive rocks formed during a period of tectonic activity subsequent to initial volcanism in the area.

In the map-area the conglomerate forms the basal unit of the sedimentary sequence, faces south and is bounded on the north by the Kashaweogama Lake Fault just north of the Marchington River. On the north shore of Schist Lake the conglomerate occurs north of the Kashaweogama Lake Fault as well and may unconformably overlie the porphyritic trondhjemite batholith to the north. The high degree of deformation of the conglomerate north of the fault however renders this difficult to determine.

The conglomerate extends from the east to the west border of the map-area achieving a maximum thickness of 500 m. in the middle of the map-area. Leucotrondhjemite clasts are dominant with minor quantities of cherty siltstone and mafic volcanic pebbles near the top of the conglomerate. The clasts generally comprise 60 percent of the rock and are dominantly matrix supported. The normal range of clast size is 10 cm to 0.6 m in diameter with an average size of 30 cm Two extremely large angular clasts measured approximately 3 m in diameter

north of the largest island in the Marchington River near the centre of the map-area. Generally the clasts grade from boulder size to cobble size from the bottom to the top of the unit; the larger clasts near the bottom of the unit are angular to subrounded; the clasts are well rounded near the top of the unit. Two distinct textures characterize the trondhjemite clasts: the first type is a medium to coarse grained porphyritic hornblende-biotite trondhjemite with euhedral plagioclase crystals elongated 2:1; the second type is a medium grained equigranular biotite trondhjemite with subhedral plagioclase. The same variation to the east of the map-area on the south shore of the entrance to Stillar Bay on Savant Lake was noted by Bond (1979). Close examination of the clasts in the present map-area reveals that the two textural types are gradational into each other and the two types exist beside one another throughout the conglomerate unit. Moreover the development of equigranular characteristics within individual trondhjemite clasts is due to incipient cataclasis. The original euhedral plagioclase phenocrysts appear to have been fractured and rounded in some of the trondhjemite clasts prior to deposition.

The hornblende-biotite trondhjemite north of the Kashaweogama Lake Fault has textural variations identical to those found in the trondhjemite clasts in the conglomerate. The main mass of the batholith consists of medium to coarse grained porphyritic hornblende-biotite trondhjemite. A 600 m zone of the trondhjemite north of the Kashaweogama Lake Fault, however, exhibits varying

degrees of dynamic metamorphism. In this zone the rock is essentially a medium grained equigranular biotite trondhjemite. On some outcrops the variation from porphyritic to equigranular texture is gradational and is caused by incipient cataclasis that has fractured and displaced the corroders of plagioclase phenocrysts. Approaching the Kashaweogama Lake Fault throughout this zone the frequency of narrow ultramylonitized bands increases.

From the identical textural variation in the clasts of the metaconglomerate and the trondhjemite batholith, it appears evident that the conglomerate is largely locally derived from this felsic batholith, and, therefore, a period of tectonism including the emplacement of felsic plutonic rocks preceded the deposition of the metaconglomerate.

The conglomerate, which occurs on the north side of the Kashaweogama Lake Fault, or the north shore of Schist Lake is deformed in a similar manner to the trondhjemite. All clasts are stretched 5:1 to 15:1 and porphyritic textures are not present due to cataclasis. Ultramylonitized bands from 1 cm to 0.3 m thick are frequent in the conglomerate. Although the contact between the conglomerate and trondhjemite was found in the outcrop on the most northerly embayment of Schist Lake, the distinction between highly stretched equigranular conglomerate clasts separated by an aphanitic matrix subjected to cataclasis, and equigranular biotite trondhjemite with frequent interspersed ultramylonitized bands is difficult to make.

The matrix of the conglomerate south of the Kashaweogama Lake Fault is green, and the average grain size is 1 mm The texture is similar to a wacke with coarse, subangular to subrounded quartz and feldspar grains set in a granular matrix of quartz, feldspar and rock fragments with associated chlorite and biotite. All occurrences of conglomerate south of the Kashaweogama Lake Fault are metamorphosed to the lower to middle greenschist facies.

SILTSTONE AND FELDSPATHIC LITHWACKE

In the field the finer grained metasediments were divided into siltstone, cherty siltstone and feldspathic lithwacke. Cherty siltstone in the eastern half of the map-area forms a continuous unit resting conformably on the conglomerate and facing south. It is 50 to 60 m thick and directly underlies a mafic metavolcanic unit of the upper metavolcanic sequence for most of its extent within the map-area. Near the eastern boundary of the map-area it is overlain by feldspathic lithwacke. In the western half of the map-area cherty siltstone occurs higher up in the fine clastic metasediment section, but is thin in units to 10 m thick and discontinuous. The cherty siltstone comprises alternating beds of siltstone and chert, the latter representing up to 30 percent of the total material. Siltstone beds vary from 0.5 cm to 2.5 cm in thickness and are light grey to light green on the weathered and fresh surface. Chert beds vary from 0.5 cm to 30 cm in thickness comprising laminae from 0.5 cm to 2.0 cm

thick which weather buff to medium grey and are light grey to black on the fresh surface. No other sedimentary structures were seen in the cherty siltstone. The grain size is 0.04 mm to 0.08 mm in thin section with occasional angular quartz crystals to 0.02 mm in the siltstone layers. The rock has been metamorphosed to the greenschist facies and consists of quartz, albite, sericite/muscovite, epidote and chlorite.

Siltstones in the eastern half of the map-area face south and overlie directly a mafic metavolcanic unit of the upper metavolcanic sequence. The siltstones pinch out against this mafic metavolcanic in the west. The siltstone is up to 350 m thick and 7.2 km long. It is intercalated with rhyolitic and dacitic crystal tuffs and contains some thin silty magnetite ironstone beds near its base. In the western half of the map-area two units of metasiltstone are present. The first is continuous over a distance of 5.6 km and is up to 200 m thick. It is intercalated with and underlies the same mafic metavolcanic unit that the eastern siltstone unit pinches out against near its eastern termination and is intercalated with and contained within feldspathic lithwacke for most of its extent. Where it underlies the mafic metavolcanic unit the latter is chiefly tuffaceous in contrast to the predominant flow characteristic of the mafic metavolcanic unit in the east. This siltstone is similar in texture and composition to the lower half of its counterpart in the eastern half of the map-area. The second western unit is approximately 40 m thick, extends for a distance of 4.0 km and is

intercalated with rhyolitic and dacitic crystal tuffs. This second western unit is interpreted by the author to be the stratigraphic equivalent of the upper half of the eastern siltstone.

The siltstone is light grey to light green in colour on the weathered and fresh surface, and is similar in appearance to the siltstone component of the cherty siltstone unit. Beds are generally 0.5 cm to 2.0 cm thick. Near the base of the eastern siltstone and within the lower siltstone in the western half of the map-area several beds of silty magnetite ironstone from 1.0 cm to 6 cm thick are present. The beds consist of 0.3 to 0.6 cm euhedral grains of magnetite, which comprise up to 35 percent of the bed in a siltstone matrix in a few cases above the ironstone bearing portion of the siltstone in the eastern half of the map-area, a few rusty weathering carbonate layers from 2 cm to 25 cm thick were found. The middle and upper parts of the eastern siltstone, the upper half of the lower siltstone and all of the upper siltstone in the west contain tuff interbeds. The tuff interbeds are light to dark green on the weathered and fresh surfaces, vary in thickness from 0.5 to 15 cm and comprise up to 15 percent of the rock. The most distinct characteristic of the beds is the ubiquitous presence of angular quartz grains 0.5 to 5 mm in diameter. These grains in thin section were found to consist of aggregates of 4 to 8 individual quartz crystals and appear identical to those occurring in metamorphosed dacitic and rhyolitic crystal tuffs. The mineralogy of the siltstones comprises quartz, albite, sericite/muscovite, epidote, chlorite and magnetite.

The feldspathic lithwacke overlies the cherty siltstone near the eastern boundary of the map-area where its extent is limited. In the western part of the map-area this rock is intercalated with and overlies the conglomerate and cutcrops over a distance of 8.6 km Near the west end of the map-area this unit is intercalated with overlies and underlies the lower siltstone unit. The feldspathic lithwacke attains a maximum thickness of 400 m 2 km east of the western boundary of the map-area, but is variable in its thickness. Bedding varies from 5 cm to 50 cm and the rock is light greenish grey in appearance. Feldspathic fragments vary from 0.4 to 2 mm in diameter in a fine grained silty matrix. Grain gradation was seen in a few locations, but no other minor sedimentary structures were seen. The mineralogy of the feldspathic lithwacke commonly consists of quartz, albite, biotite, muscovite, epidote, chlorite, and magnetite.

SUMMARY

The occurrence of trondhjemitic pebbles in the conglomerate that compare in texture to initial stages of cataclasis associated with the development of the Kashaweogama Lake Fault suggests that:

a) the conglomerate was deposited after a period of tectonism involving the emplacement of felsic plutonic rocks and is chiefly derived from this rock;

b) initial deformation of the trondhjemite batholith by the Kashaweogama Lake Fault began before the conglomerate was deposited and the faulting may have influenced the formation of this conglomerate.

The absence of ultramylonitized clasts in the conglomerate south of the Kashaweogama Lake Fault and the existence of this texture in conglomerates and the batholith north of the fault is evidence that faulting persisted subsequent to the deposition of the conglomerate.

A complex succession of finer clastic metasediment overlies and locally is intercalated with the conglomerate. The finer metasediments include cherty siltstone, feldspathic lithwacke and siltstone. Minor local magnetite ironstone and carbonate beds occur in the siltstone. The siltstone also is intercalated with metamorphosed rhyolitic to dacitic crystal tuffs of the upper metavolcanic sequence.

METAMORPHOSED MAFIC INTRUSIVE ROCKS

Mafic intrusive rocks form a few sills within the lower and upper metavolcanic sequences and within the Schist Lake granitic stock and a stock of 1.5 km east of the south end of Farrington Lake near the southeast corner of the map-area. The contacts of the sills and stock are not exposed. The interpretation of the sills as intrusive is tentative.

FARRINGTON LAKE STOCK

The Farrington Lake Stock intrudes the lower mafic metavolcanic sequence 2 km east of the portage between Farrington and Schist Lakes. This pluton is bounded on the south by trondhjemitic batholith rocks and on the north by the upper metavolcanic sequence, but, boundary relationships are not evident in outcrop. An elliptical body with an average diameter of 3 km, the mafic pluton pinches to a sheet between rocks of the southern trondhjemitic batholith on the eastern boundary of the map-area. An irregular discordant body of quartz monzonite intrudes the western edge of the stock.

The metamorphosed mafic stock is composed of amphibolite rimming its western and northern edges, gabbro and quartz diorite in the interior and quartz diorite on the eastern edge. Gabbro is the dominant rock type forming about 70 percent of the stock.

In thin section the metagabbro is equigranular with a grain size of 2 to 3 mm. Plagioclases are equant. Hornblende is the main mafic mineral comprising approximately 35 percent of the rock as stubby crystals with ragged ends and is altered on all edges to chlorite which comprises approximately 10 percent of the rock. Plagioclase, although it shows albite and pericline twinning, yields poor extinction angle determinations partly due to epidote alteration and partly due to zoning. Minor quantities of quartz, carbonate,

magnetite and pyrrhotite are also present. The gabbro weathers greyish green and is dark greyish green on the fresh surface. A weak foliation is developed in the rock.

The metamorphosed quartz diorite comprises 70 percent felsic minerals (plagioclase (An38) and quartz) and 30 percent mafic minerals (hornblende, biotite and chlorite). Epidote occurs as a very fine grained alteration product of plagioclase. Grain size averages 1.0 mm Plagioclase shape varies from equant to rarely euhedral laths, and exhibits zoning in some crystals. The other minerals are interstitial to plagioclase and form a mosaic texture. Hornblende is the dominant mafic mineral and chlorite forms alteration rims on this mineral. Biotite occurs in small clusters. The hornblende as in the metagabbro occurs as stubby crystals with ragged ends. Pyrrhotite, magnetite and carbonate form in minor quantities in all areas. The metamorphosed quartz diorite is more distinctly foliated than the metagabbro, in part due to the parallel alignment of biotite clusters. The rock is light greyish green on both weathered and fresh surfaces.

The amphibolite varies in grain size from place to place from 0.2 mm to 3.0 mm It is dark greyish green on weathered and fresh surfaces and is weakly foliated. Textures in the amphibolite are similar to the metagabbro and metamorphosed quartz diorite. Hornblende 80 percent, chlorite 10 percent, plagioclase 7 percent, are the major mineral components. Minor epidote, magnetite and pyrrhotite are also present. Plagioclase forms equant subhedral crystals. Hornblende

occurs as stubby crystals with ragged ends. Chlorite rims the hornblende crystals.

Chemical analyses and molecular norm calculations for the Farrington Lake Stock appear in Table 15.

METAMORPHOSED MAFIC SILLS

Eight metamorphosed mafic sills occur in the upper metavolcanics and the Schist Lake granitic stock. No contacts were found in the field and their classification as sills is somewhat tentative. These rocks are texturally similar to medium to coarse grained metavolcanic flows and it is possible that they are extrusive in part.

All of the rocks classified as mafic sills are medium to coarse grained, but several rock types are included. Two of the mafic sills which occur in the Schist Lake Granitic Stock are gabbroic and two are dioritic in composition. Since each is represented by a single small outcrop and no contacts were seen, internal variation and boundary relations were not apparent. Since all of these are associated with migmatitic zones in the stock and are proximal to screens of metavolcanics in the granitic rock, it may be that these are originally coarser grained or more thermally metamorphosed equivalents of the metavolcanics. The mafic sills within the metavolcanics vary from metagabbro to amphibolite and are dark greyish green to dark green and greenish black on weathered and fresh

surfaces. No contacts are well exposed. Only three of the sills are greater than 100 m in thickness. One of these northeast of the Farrington Lake Stock intrudes intermediate metavolcanics of the upper metavolcanic sequence and may actually be continuous with the Farrington Lake Stock. Another which attains a thickness of 200 to 400 m occurs on the boundary of felsic to intermediate and mafic metavolcanics of the upper metavolcanic sequence on either side of Farrington Lake. The third significant sill appears to be at least 300 m thick and intrudes intermediate metavolcanics 1.6 km east of Drive Lake. Its actual extent is obscured by the esker-delta complex.

FELSIC INTRUSIVE ROCKS

Felsic intrusive rocks were subdivided in the field on the basis of mineralogy and texture. The rock types include granite, quartz monzonite, granodiorite, trondhjemite and diorite. These rocks variously contain hornblende or biotite as the dominant mafic mineral. Texturally the felsic intrusive rocks variously are porphyritic, massive, foliated (parallel alignment of mafic minerals plus frequently a crude parallel alignment of quartz and feldspar), or gneissic (compositional layering).

Approximately 60 percent of the felsic intrusive outcrops were sampled in the field for stain tests of the feldspars (leaching with hydrofluoric acid, staining with sodium cobaltinitrite solution). Eight additional samples were thin sectioned.

Field evidence strongly suggests the existence of at least two general ages of emplacement of felsic intrusive rocks in the map-area. These two ages of felsic intrusive rocks could not always be reliably distinguished in the field due to overlapping compositions and macroscopic textures observed. However, the early felsic intrusive rocks tend to display metamorphic textures; foliation, gneissic foliation and cataclasis. The late felsic intrusive rocks tend to be massive to slightly foliated. The early felsic intrusive rocks in the map-area appear to be intruded passively, forming sheet-like bodies that are concordant to the trend of the supracrustal rocks and contain extensive screens and migmatitic zones. These rocks also tend to be impoverished in potassium feldspar in comparison to the later massive intrusive rocks. The early felsic intrusive rocks form two batholiths bounding the map-area on the north and the south.

The later massive felsic intrusive rocks form a stock south of Schist Lake which is in part discordant with the supracrustal rocks. These rocks appear to be relatively unmetamorphosed, and are compositionally richer in potassium feldspar.

EARLY FELSIC INTRUSIVE ROCKS

FAIRCHILD LAKE BATHOLITH

The area north of the Marchington River is intruded by early granitic rocks herein named the Fairchild Lake Batholith. These rocks are trondhjemitic with local, ill-defined, and generally minor quantities of quartz monzonite in the northeast and northwest corners of the map-area. In the field the compositional change is gradual, and is sometimes not apparent from the weathering properties of these rocks. Textural distinctions in the rock are apparent and appear to be largely the result of variation in the degree of dynamic and thermal metamorphism The rocks weather white to whitish pink and the contacts of quartz monzonite and trondhjemite intrusions are not well defined. Their relative age relationships were not detected in outcrop.

The Fairchild Lake Batholith contains approximately 7 percent xenoliths and screens of mafic and ultramafic rocks believed to have originated as the Jutten volcanics. These screens are elongated parallel to foliation in intrusive rocks and the supracrustal rocks to the south. The mafic rock is dark green to greenish black and medium to coarse grained.

The porphyritic (hornblende-biotite bearing) variety of trondhjemite forms approximately 20 percent of the batholith in east trending zones. It is normally flanked by medium to coarse grained equigranular biotite trondhjemite which underlies approximately 55 percent of the batholith. Fine to medium grained biotite trondhjemite is foliated to locally gneissic and occurs in narrow east trending

zones underlying approximately 10 percent of the batholith. Approximately 8 percent of the batholith is underlain by porphyritic banded hybrid biotite quartz monzonite. The gneissic quartz monzonite in the northwest corner of the map-area may actually be a granitized and gneissic metasediment.

In the porphyritic hornblende-biotite trondhjemite, plagioclase (An 28) phenocrysts range from 3 to 8 mm in length and range from equant to 2:1 elongation. These phenocrysts normally comprise 30 percent of the rock and are subhedral due to corroded and, in part, recrystallized crystal faces in the best preserved samples. Mattes of sericite, saussuritized plagioclase and epidote in anhedral grains generally cloud the plagioclase phenocrysts. The grain size of the matrix minerals is usually one-tenth that of the phenocrysts. In addition to phenocryst corrosion by fine grained plagioclase and quartz the matrix is normally hypidiomorphic granular with foliated hornblende and biotite as individual grains and flakes respectively. One thin section, with equant phenocrysts, has a 'flowage' texture in the matrix.

The porphyritic hornblende-biotite trondhjemite grades into medium to coarse grained biotite trondhjemite, the transition normally characterized by differential degrees of dynamic metamorphism The medium grained biotite trondhjemite has an average grain size of 1 mm, is hypidiomorphic granular with a slight foliation of feldspars as well as biotite. Rare skeletal or fractured and displaced

plagioclase phenocrysts to 6 mm in diameter are present. Quartz, plagioclase (An 28), biotite, epidote, magnetite, zircon, apatite and saussuritized plagioclase comprise this rock.

Narrow zones of east trending fine to medium grained biotite trondhjemite which are up to 1 km wide are contained within the medium to coarse grained biotite trondhjemite. The average grain size of this rock is approximately 0.3 mm, but is variable. Ultramylonite zones up to 1 cm thick which parallel foliation are very fine grained to aphanitic aggregates of quartz and plagioclase and comprise approximately 2 to 10 percent of the rock. Grains are generally anhedral, and the texture is seriate. The foliation of biotite and feldspars is weak but in some areas a weak gneissic foliation is developed.

One of the main areas in which this rock is found is a zone along the southern margin of the Fairchild Lake Batholith where it is truncated by the Kashaweogama Lake Fault.

Cobbles and boulders of the porphyritic hornblende-biotite trondhjemite and the medium to coarse grained biotite trondhjemite are the dominant clasts in the metaconglomerate which underlies the north shore of the Marchington River System in the map-area. In the east half of the map-area, the metaconglomerate and fine to medium grained biotite trondhjemite are separated by the Kashaweogama Lake Fault. However in the west half of the map-area the metaconglomerate

appears to unconformably overlie the trondyjemite. The significance of the textures of clasts in the metaconglomerate and in the Fairchild Lake Batholith is that they provide evidence for the mechanism of development of the sedimentary-volcanic basin south of the Kashaveogama Lake Fault. The important facts which enable development of the hypothesis follow:

1) Mafic and ultramafic xencliths and screens occur in the Fairchild Lake Batholith, suggest that this batholith pre-dates the Jutten volcanics.

2) Porphyritic and medium to coarse grained trondhjemite are found in the Fairchild Lake Batholith and as clasts in the metaconglomerate unit.

3) The medium to coarse grained trondhjemite is the product of cataclasis of the porphyritic trondhjemite.

4) Fine to medium grained trondhjemite with ultramylonite zones occurs in the batholith and especially in a zone parallel to and contacting the Kashaveogama Lake Fault. These textures are not evident in clasts in the metaconglomerate.

5) The metacorglomerate appears to unconformably overlie the trondhjemite in the west half of the map-area.

6) Angular clasts to 3 m in diameter of trondhjemitic composition are present in the metaconglomerate.

7) The metaconglomerate has a lithwacke matrix.

The above evidence suggests the following hypothesis of rock emplacement, tectonics, and basin development:

1) The lower mafic metavolcanics (Jutten volcanics) were intruded by the Fairchild Lake Batholith (characterized predominantly by a porphyritic trondhjemite).

2) Initial cataclasis of the batholith resulted in the destruction of plagioclase phenocrysts producing a medium to coarse grained biotite trondhjemite. The cataclasis was associated with the initial movement on the Kashaweogama Lake Fault and parallel zones within the batholith. The fault movement accommodated uplift of the batholith and basin subsidence south of the fault. It is suspected since the upper metavolcanics overlie the metaconglomerate everywhere that the initial basin subsidence preceded the deposition of sediments and volcanism

3) As movement along the fault proceeded, deposition of fanglomerates, as a proximal facies, derived from debris from the trondhjemite close to the fault scarp, began.

4) With continued basin subsidence, volcanism centred to the south and east, caused the emplacement of distal tuffs and some flows. Epiclastic sediments intercalated with the volcanics were derived from reworking of volcanic debris and fine to coarse grained sediment from the eroding Fairchild Lake Batholith.

5) Subsequent metamorphism resulted in superimposed foliation in all pre-existing rocks in the map-area. The Fairchild Lake Batholith was in part recrystallized, and gneissic textures were formed preferentially in areas which previously had undergone significant strain through dynamic metamorphism

THE LEWIS LAKE BATHOLITH

The Lewis Lake Batholith underlies the southern boundary of the map-area and lies directly south of the Schist Lake Stock, the Lower Mafic Metavolcanic Sequence and the Farrington Lake Mafic Stock. Dominantly a medium to coarse grained biotite trondhjemite with significant amounts of biotite quartz monzonite and hornblende-biotite granodiorite, it appears to be intruded by a late hornblende quartz-monzonite to hornblende-biotite granodiorite stock, immediately north of Watin Lake. The textural and compositional distinction between the stock and batholith are insufficient to accurately outline their mutual boundary. The trondhjemite is medium to coarse grained and slightly foliated. Relict plagioclase phenocrysts were seen only on one outcrop. The rocks weather white to

whitish pink and the contacts with the quartz-monzonite and granodiorite are indistinct. Trondhjemite comprises approximately 70 percent of the batholith. Quartz-monzonite and granodiorite occur in approximately equal proportions. No thin sections were examined of these rocks. In the field they resemble the medium to coarse grained rocks in the Fairchild Lake Batholith, but have less cataclasis and mylonitization. The rocks appear through their more prominent foliation to have been more severely thermally metamorphosed and recrystallized than the rocks of the Fairchild Lake Batholith.

A screen of mafic material occurs in the Lewis Lake Batholith east of Lewis Lake and 300 m south of the interpolated contact between the batholith and the Lower Mafic Metavolcanics. For this reason the batholithic rocks are believed to be intrusive into the Lower Mafic metavolcanics.

LATE FELSIC INTRUSIVE ROCKS

SCHIST LAKE STOCK

Four hundred metres south of Schist Lake the Schist Lake Stock forms a concordant contact with rocks of the upper metavolcanic sequence. This stock underlies an area of 46 km2 within the map-area including the western boundary south of Schist Lake. On its eastern boundary the stock truncates rocks of the upper metavolcanic sequence; although some contacts are concordant. Its southern boundary is

marked by a zone of migmatization with occasional screens of supracrustal rocks. The Lewis Lake Batholith lies directly south of this zone.

The Schist Lake Stock is 90 percent comprised of hornblende biotite granite. On the northern and eastern margin hornblende granodiorite forms a zone averaging 200 m in width. The southern boundary which is migmatitic is occupied by biotite trondhjemite and granodiorite. A contact metamorphic aureole from 100 to 300 m wide is found in the supracrustal rocks to the north of the stock. Metamorphism is to the lower amphibolite facies in this zone.

The granite weathers whitish pink, and is gererally coarse grained. Often, swarms of randomly oriented cross-cutting dikes of this granite were seen to intrude each other. No variations in grain size were seen in these dikes and the composition and textures are identical in each dike. Widths of the dikes vary from 4 m to 200 m but may be much larger.

Mafic minerals generally comprise less than 5 percent of the rock. A wide variation in foliations occurs in the rock, but biotite and hornblende show a weak foliation in some cases concordant with the supracrustal rocks to the north. There also appears to be a northeast trending foliation. Foliation of quartz and feldspar, where seen in the dikes, parallels the dike walls and provides the only distinction between individual intrusive units. In outcrop, quartz grains weather

high and feldspar grains weather low. In the two thin sections of grains observed, the feldspar and mafic minerals were found to be interstitial to quartz. The quartz occurs in subhedral crystals averaging 2 mm in diameter and comprises 40 percent of the rock. Microcline 40 percent, plagioclase (An 12) 15 percent, biotite 4 percent, hornblende 1 percent are the remaining essential minerals. Accessories include apatite, sericite, epidote and magnetite. The feldspars average 1.5 mm in diameter and are subhedral to anhedral. Plagioclase, in particular, exhibits corrosion of grain boundaries. The granodiorite bordering the stock is similar in texture and grain size to the granite. The relative proportion of quartz is the same as in the granite and the mafic minerals; chiefly hornblende, comprise 10 percent of the rock. Plagioclase is less sodic at An 28 and comprises 2/3 to 3/4 of the total feldspars. Potash feldspar is represented by equant but anhedral microcline. The boundary relationships with the granite were not noted in the field but are probably gradational because identification of this border zone was only made in the base camp by stain tests of specimens from most outcrops. The northern contact with supracrustal rocks was not observed, as a 2 to 10 m wide zone marking this contact zone weathers low. No fining of the granodiorite towards the contact, chill effects, xenoliths or apophyses into the supracrustal rocks were noted in the field along the northern boundary of the intrusion.

WATIN LAKE STOCK

A 1.2 km diameter stock of hornblende biotite quartz-monzonite and hornblende granodiorite lies north of Watin Lake. This stock is encircled by trondhjemite, quartz monzonite and granodiorite of the Lewis Lake Batholith. However, the mutual boundary of the stock and batholith could not be reliably determined due to the paucity of outcrop and the similarity in composition.

Hornblende and biotite foliations in the stock are weak, but parallel the regional east-west trend of the batholith. The rock is medium to coarse grained and equigranular. No thin sections were examined.

SUMMARY

Felsic intrusive rocks of two ages underlie the map-area. The older batholithic rocks were emplaced subsequent to early mafic volcanism and show the effects of regional dynamic and thermal metamorphism These batholithic rocks predominantly consist of trondhjemite with lesser amounts of quartz-monzonite and granodiorite. Evidence from the relationship of the metaconglomerate and the Fairchild Lake Batholith suggests that these older batholithic rocks occupied a hinterland that flanked the marine basin during the accumulation of the upper metavolcanic sequence and metasediments in the area.

The younger felsic intrusive rocks are richer in potassium than the older batholithic intrusives and are the youngest rocks in the map-area. These younger felsic intrusives in part truncate the

supracrustal and batholithic rocks. A weak penetrative foliation is evident in the younger intrusives, but this is not accompanied by dynamic metamorphism.

CENOZOIC

PLEISTOCENE

During the Quaternary Period, the map-area was covered by several ice masses, the last being the Wisconsinan Sheet which began retreating between 14,000 and 13,000 years ago (Prest 1970). According to Prest (1970), the margin of the ice had retreated to a position just north of the map-area sometime between 10,600 and 10,300 B.P., and at that time, the map-area was covered by glacial Lake Agassiz. Following this, a minor readvance of the ice front occurred between 10,300 and 10,000 years B.P. Subsequently, from 10,000 to 9,500 B.P., the ice retreated for the last time.

In the map-area evidence of only one ice movement was observed. Quaternary deposits include till, and moraine (called rib moraine by Zoltai (1965) and De Geer moraine by Prest et al. (1967) and glacio-fluvial deposits within an esker delta complex and kames. The higher outcrops in the map-area are wave washed.

Approximately 50 percent of the map-area is covered by a mantle of bouldery, cobbly and silty sand till from 0.3 to 10 m thick. This

glacial till has modified the local relief; thicker till deposits fill valleys between bedrock outcrops while the thinner deposits occur on hills. Glacial striae, chatter marks, and rare fluting in the map-area indicate a general trend of ice movement toward S 30 degrees W. However, some readings, notably from Schist Lake and the Marchington River, which form a prominent valley, indicate local ice movement toward S 60 degrees W. A type of recessional moraine called rib moraine by Zoltai (1965) and De Geer moraine by Prest et al. (1967) occurs in the map-area adjacent to the esker delta on both sides north of the Marchington River. This feature also occurs east of Farrington Lake in an area surrounding the Farrington Lake Mafic Stock. In all approximately 50 km2 of the map-area is underlain by this feature. Characteristically the moraine occurs in low flat areas, and comprises semicontinuous east-west ridges 4 m high and 20 to 30 m wide, each separated approximately 40 m. The valleys between the ridges are generally wet and poorly drained. This feature is believed to originate at the ice front when the glacier is in contact with deep water.

A southwesterly trending esker delta complex traverses the middle of the map-area. This feature averages 3 km in width, and is generally flat on top. A few rounded kames occur on the western margin of the esker delta south of the Marchington River. Several small ice depression features up to 20 m deep are formed within the esker delta south of the Marchington River and near its western edge. Shorelines of several lakes and bays are formed against the esker delta. Drive

Lake on the west side of the esker delta and Tripoli Lake on the east side of the esker delta are believed to be depressions left by thicker sections or lobes of the ablating ice sheet. South of Schist Lake, near its western end, a kame moraine forms high rounded hills with 20 m local relief. The esker delta and kame moraine appear to contain mainly medium to coarse grained sand with local grit lenses. A gravel deposit, from a beach formed on the esker delta occurs approximately 0.5 km east of the unnamed lake in the southwest corner of the map-area. Eroded sections of the esker delta along the Farrington River and north of the river have a surface cover of intermittent cobbles and bolders. Shoals of cobbles and boulders within the Marchington River whee it intersects the esker delta complex are remnants of the complex.

The Schist Lake Stock, the Farrington Lake Mafic Stock and the Lower Mafic metavolcanics all form elevated outcrops in the map-area. These outcrops, and the flat portion of the esker delta complex south of the Marchington River were wave washed in Glacial Lake Agassiz. Exposure in these areas is excellent, the cover being restricted to lichen and moss.

No lake clays were seen in the map-area but these may occupy some of the low ground which has not been eroded to expose such deposits.

STRUCTURAL GEOLOGY

FOLIATION AND CLEAVAGE

The majority of the metavolcanics and the metasediments have a prominent secondary foliation arising from the sub-parallel alignment of amphibole, biotite, or chlorite during regional metamorphism Clasts in conglomerate, and pillow lavas are generally elongated parallel to the foliation. Foliation is also well developed in the metamorphosed granitic rocks. The younger granitic stocks in the area also display a weak secondary foliation. Metagabbros display a weak foliation which may be primary.

Foliations in the map-area indicate the presence of two axial plane cleavages. Boundaries between lithologic units have a gently curvilinear trend varying in strike from N 80 degrees W to N 80 degrees E within the map-area, as do primary planar structures which vary in dip 75 degrees N to 75 degrees S. The younger axial plane cleavage trends at N 50 degrees E; the older trends at N 80 degrees E to N 85 degrees W, being parallel in strike to the lithologic units. The bulk of foliation measured in the map-area and which are most prominent in outcrop were imparted during an early stage of folding and correspond to the older axial plane cleavage.

Contoured plots of poles to the foliation were made corresponding to the following areas:

Figure 2. Lower Mafic Metavolcanics

Figure 3. Intermediate Metavolcanics between the Lower Mafic Metavolcanics and the more southerly mafic metavolcanic unit of the upper metavolcanic sequence.

Figure 5. All supracrustal rocks excepting the Lower Mafic Metavolcanics.

Figure 6. The Lewis Lake Granitic Batholith.

Figure 7. The Schist Lake Stock.

Figure 8. The Fairchild Lake Granitic Batholith.

Pole plots to foliation in the Farrington Lake Mafic Stock appear in Figure 4 and because of the low number (14), are not contoured.

The Fairchild Lake Batholith, the Lewis Lake Batholith and all the metavolcanic and metasedimentary rocks show conformity of foliation within a narrow range. The Schist Lake Granite Stock which is only weakly foliated, shows more variability of foliation and some foliations parallel to the younger axial plane foliation. The plots from the Farrington Lake Stock are insufficient in number for statistical analysis but on preliminary analysis appear to define a small circle analogous to a conical body. This is further evidence that the foliations here are primary.

The batholithic intrusive rocks display a variety of styles of foliation, especially in the Fairchild Lake Batholith. Weak foliations are typified by parallelism of hornblende and biotite. This becomes gradationally stronger in areas which have undergone mild cataclasis, as plagioclase grains also show parallel alignments. With stronger cataclasic ultramylonitized zones enhance the foliation, and where this feature is combined with thermal metamorphism a gneissic foliation is the result. At this final stage all of the original minerals have been recrystallized.

Based upon contoured plots of poles to foliations a difference of 6 degrees in mean foliation attitude between the Lower Mafic Metavolcanics and the Upper Metavolcanics was noted. Although these foliations are largely penetrative it is suggested that this difference is due to a disconformable relationship between the upper and lower metavolcanic sequences. Any passive deformation since deposition of these rocks would tend to minimize pre-existing differences in attitudes.

LINEATION

Few lineations were observed. Lineations were determined from preferred mineral orientation and Z-folds. Mineral lineations do not yield a statistically significant and consistent orientation. This is probably due to the existence of more than one period of folding.

Some of these mineral lineations are, however, parallel to Z-folds axes which yield a hinge line direction of N 50 degrees E to N 60 degrees E and a plunge of approximately 70 degrees. The remaining lineations are scattered within 30 degrees of an east-west line and plunge shallowly to steeply in either direction. The Z-folds are believed to be the result of the later period of folding, and occur frequently throughout the supracrustal rocks in the area.

FOLDING

The map-area is on the western limb of a large fold, the axial trace of which trends northeast and is located 16 km to the east (Bond 1974). The only folding of this generation noted in the map-area are minor Z-folds which occur frequently throughout the supracrustal rocks. However, a mild foliation of biotite and muscovite transecting stronger previous foliations is found infrequently in supracrustal rocks in the map-area and in the Schist Lake Granite Stock, paralleling the axial plane of this fold described by Bond (1974, 1979).

The first period of deformation imparted the strongest foliation in the map-area and formed isoclinal folds. Folding of this generation may have caused some of the repetition of lithologic units. Two minor folds of this generation were outlined in the field and one major fold was inferred from mapping. On the south shore of Fairchild Lake near the eastern boundary of the map-area a synform fold occurs in

the metasedimentary rocks and appears to trend eastwards across the map boundary. Bedding, distinguished by compositional layering, and cleavage, which is a strong schistose foliation, were observed on either side of the fold. The fold does not appear to extend into the mafic metavolcanic unit bordering the metasediments immediately to the south. This mafic metavolcanic appears to be south facing wherever determinations were made, and, therefore, it does not conform to this minor fold. Shearing along the contact 1 km to the west may well extend along the mutual boundary and the flank of the fold such that the formation of the fold was accommodated by flexural slip movement on this boundary. The fold appears to terminate 1 km west of the eastern boundary of the map-area.

The second minor fold is an anticlinal axis which occurs in mafic metavolcanics 150 m south of the third portage between Fairchild Lake and Schist Lake. This fold axis could only be defined for 400 m but may extend further. The axial plane strikes east-west and the hinge line is horizontal.

A major synclinal fold is inferred to be contained within mafic metavolcanics of the upper metavolcanic sequence where it crosses Farrington Lake. Here a pillow lava gives north facing indications. The few determinations from flow contacts and tuff fining directions south of this point all yield north facing directions. North of this pillow lava outcrop all determinations in the metasediments and metavolcanics indicate a south facing direction. North-south

sectional views of this mafic metavolcanic along most of its strike would exhibit crude symmetry of units if allowances are made for certain units pinching out. However, insufficient determinations of facing and/or cleavage intersecting primary depositional planes were made, in the author's view, to accurately define the location of the fold axis across the map-area.

FAULTING

One major fault and several minor faults occur in the map-area. Very few contacts between lithologic units are exposed and shearing frequently may be seen to increase in intensity close to contacts between lithologic units displaying a competency contrast. The author believes that this may be partly due to flexural slip along lithologic unit boundaries which would have accompanied isoclinal folding of the first period of deformation.

Several small shear zones on lithologic contacts were noted on the map and are concordant with the lithologic units.

Within Schist Lake, Fairchild Lake and north of the Marchington River, the east-west trending Kashaweogama Lake Fault separates metaconglomerate on the south from trondhjemite of the Fairchild Lake Batholith to the north. Moderate cataclasis in some trondhjemite clasts in the conglomerate beside undeformed trondhjemite clasts, both of which are similar to textures in the trondhjemite batholith

point to the proximal origin of the metaconglomerate. Association of the cataclasis with faulting, moreover, suggests that initial movement on the fault occurred before deposition of the conglomerate, that the conglomerate may be a fanglomerate, and that the fault further accommodated basin subsidence with the accumulation of the upper sequence of volcanic rocks and intercalated sediments. Zones of ultramylonite are present in rocks north of the fault, but this texture is not evident in metaconglomerate clasts south of the fault. Locally the zones of cataclasis have been transformed through complete recrystallization (regional thermal metamorphism) to gneisses. This gneissosity is parallel to foliations in the supracrustal rocks attributed to the first period of folding in the area. Thus it would appear that movement on the fault continued after the deposition of the metaconglomerate and probably continued during the oldest period of folding in the area, but ceased prior to the termination of this orogenic event resulting in local gneissic textures which have not since been disturbed by major movement.

A prominent lineament which trends through the centre of Runway Lake is near the projected strike of the Miniss River Fault (Hudec 1965), suggesting that fault movement occurred along it. It also is close to the boundary of the Wabigoon and English River Subprovinces.

ECONOMIC GEOLOGY

The Savant Lake Region has been prospected for precious metals since

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the turn of the century. Prior to 1965 only minor base metal exploration was undertaken, but the discovery of base metal deposits in the vicinity of Sturgeon Lake, approximately 80 km to the south, has spurred interest in the general area since 1968.

In the Farrington Lake area a few trenches in quartz veins remain as evidence of early exploration activity. More recently some companies have been engaged in airborne and ground geophysical prospecting. Exploration has been hampered by poor access and lack of detailed geological information.

Only two areas were found where minerals of economic interest outcrop at surface.

On the northeastern side of the most easterly rapids in the Marchington River within the map-area minor close to where Drive Creek enters the river, local chalcopyrite with malachite and azurite were found by the author and are associated with a sub-horizontal shear in granodiorite. Chalcopyrite occurs as disseminated crystals 0.5 cm in diameter in a finer grained, biotite schist zone exposed for a length of 0.9 m, a width of 0.3 m and a maximum thickness of 2.5 cm within the granodiorite. The matrix of the granodiorite has no visible mineralization. The mineralization may be associated with a xenolith.

A small showing of weathered pyrite and pyrrhotite occurs at the end

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of a bay on the northern side of the largest island in Schist Lake. The showing is severely weathered with a limonite gossan 2 m high. Approximately 20 percent barren sulphides were visible. No chalcopyrite or sphalerite were visible; but a grab sample collected by the author was assayed by the Mineral Research Branch, Ontario Division of Mines, and contained 0.08 percent Cu, 0.49 percent Zn, trace Pb, trace Ag, and 0.01 ounce Au per ton. The host rock is comprised of intercalated tuff and siltstone. The Canadian Nickel Company Limited tested this horizon by diamond drilling as previously noted herein under "Mineral Exploration" but encountered only minor barren sulphide mineralization and graphite.

DESCRIPTION OF PROPERTIES

CANADIAN NICKEL COMPANY OCCURRENCE (1)

In 1968, Canadian Nickel Company Limited held two claims on an island near the eastern end of Schist Lake and submitted one diamond-drill hole log for assessment credit. The hole was drilled in siltstone, and feldspathic lithwacke intercalated with tuff to a length of 68 m Minor barren sulphide mineralization and graphite were reported to be disseminated throughout the length of the core. The claims were allowed to lapse in 1970.

CANEX AERIAL EXPLORATION LIMITED (1969) (2)

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In 1969, a combined electromagnetic and magnetic survey was performed for Canex Aerial Exploration Limited and was submitted as assessment on 48 claims within the present map-area. The claims were situated between the middle of the eastern side of Farrington Lake and the eastern boundary of the map-area. No significant anomalies were encountered, no further assessment has been recorded, and all the claims have lapsed.

NORANDA EXPLORATION COMPANY (1971) (3)

In 1970 and 1971, Noranda Exploration Company examined three claim blocks within the map-area. In all three blocks the claims were staked over aerial electromagnetic anomalies. Ground electromagnetic and magnetic surveys were submitted for assessment credit. The first property consisted of eight claims on the northern shore of the Marchington River 2.4 km east of Schist Lake. A vertical loop electromagnetic (VLEM) survey outlined an east-trending conductor. An east-trending magnetic anomaly was defined 60 m south of the VLEM anomaly at the eastern end of the property. The two anomalies intersect each other 1.2 km to the west. The magnetic anomaly was interpreted to correspond to the contact of the metavolcanics and metasediments. The VLEM anomaly was attributed to a graphitic shear zone. No further work was reported and the claims have since lapsed.

The second property consisted of two claims on the northern shore of the Marchington River 3 km west of Farrington Lake. Ground VLEM and

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magnetic surveys failed to outline any anomalous zones. No further work was reported and the claims have since lapsed.

The third property comprised four claims situated 0.8 km directly north of Drive Lake. Ground electromagnetic and magnetic surveys delineated one anomalous zone on the eastern boundary of the property. Further work was recommended, but not since reported, and the claims have lapsed.

UNION MINIERE EXPLORATION COMPANY LIMITED (1977) (4)

In February, 1977, Questor Limited conducted an airborne magnetometer survey on behalf of Union Miniere Exploration Company Limited (UMEX) over a large part of the map-area.

The survey was filed for assessment credit and covers an area overlapping the southern boundary and eastern boundary of the map-area. The western boundary of the survey is a north-south line 1.3 km west of Lewis Lake; the northern boundary parallels and is 0.8 km north of Fairchild Lake. The assessment was applied to 3 claim groups in the area. Twenty-two claims on, north and west of Lewis Lake comprise one group; 8 claims on the western shore of Farrington Lake near its southern end comprise a second group and; eighteen claims near the eastern boundary of the map-area due east of Lewis Lake comprise the third group. The survey employed a proton precession magnetometer flown at an altitude of 140 m above ground

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level, and the line spacing was 200 m. Several weak linear magnetic anomalies were noted in the survey.

In August, 1977, presumably as follow-up to the magnetic survey UMEX drilled a hole on the west side of Farrington Lake 1.6 km north of its south end and submitted this drill hole for assessment credit. The hole was drilled at N20E dipping 45 to a length of 110 m intersecting intercalated felsic, intermediate and mafic tuffs. Disseminated pyrite was encountered in some of the felsic tuff over a width of over 30 m.

In April, 1978, Barringer Research Ltd. conducted airborne proton precession magnetometer and VLF electromagnetic surveys on behalf of UMEX Ltd. over a reduced and irregular area. The survey area covered all of Farrington Lake and the North part of Lewis Lake and projects east past the eastern boundary of the map-area. The survey was conducted at an altitude of 70 m above ground with a line spacing of 125 m. The same magnetic anomalies observed in the previous survey were evident. Several E.M. anomalies were encountered at an angle to the magnetic anomalies and were attributed to conductive overburden. All of the claims have since been allowed to lapse.

SUGGESTIONS AND FUTURE MIERAL EXPLORATION

Two old trenches found near the southern shore of Fairchild Lake and the Marchington River were excavated, apparently to assess secondary,

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discontinuous quartz veins. Quartz veins are numerous in the mafic metavoclanics or the Marchington River. The association of mafic flows, a continuous strike fault with some minor auxiliary faults, ferruginous and carbonatite-bearing metasediments, and a granite intrusive make the near Schist Lake and teh Marchington River attractive for gold prospecting. Approximately 1 percent disseminated pyrrhotite was found in the amphibolite phase of the gabbroic complex in the southeastern corner of the map-area. The northwestern and southwestern edges of the complex are predominantly gabbro and amphibolite and appear to be the best areas for prospecting for copper-nickel mineralization. The magnetic expression of the gabbro on the Schist Lake and Kashawecgama Lake Maps of the Aeromagnetic series (ODM GSC 1961a, b) suggests that the gabbro is more extensive in subsurface than indicated by mapping, and may extend about 0.8 km under a veneer of granitic rocks to the south.

Several magnetically anomalous areas are shown on the accompanying map. All of these have a magnetic relief of 100 to 200 gammas. Of these, that north of Tripoli Lake is associated with the contact of intermediate to felsic pyroclastic rocks containing lapilli-tuff and intermediate metavolcanics to the south. The contact is overlain by at least 30 m and possibly over 60 m of sand and gravel. Further ground exploration of this anomaly using deeper penetration EM or IP methods is recommended.

Felsic and intermediate metavolcanics are intercalated in the central

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part of the map-area and have not received attention in the past because of the thick cover of overburden, (sometimes exceeding 60 m), the resultant low response to airborne prospecting, and the previous lack of detailed geological maps. These areas warrant examination on the ground using geochemical techniques or deep-penetration geophysical methods.

The sulphide showing on the large island in Schist Lake has been drilled previously, but merits more attention. Due to the general continuity of the metasedimentary units in the area and the potentially significant zinc assay, prospecting of this sulphide horizon along strike for copper-zinc mineralization is strongly recommended.

Some ultramafic rocks were found in the northeastern part of the map-area. Although enclosed by granite and not mineralized where examined, these rocks have apparently not been prospected before and may merit further scrutiny. One of these outcrops on the northeastern shore of Fairchild Lake is a very soft, impurity-free, talc-carbonate bearing rock; this soapstone appears to be potentially good carving material. The well exposed part of this outcrop is about 6 m long and 3 m wide.

REFERENCES

Ayres, L.D.

In the interest of rapid dissemination of the results contained in this Report, some of the data may not have been meticulously checked. Thus the OGS does not guarantee the accuracy of these figures and suggests the reader check original sources.

1972: Guide to Granitic Rock Nomenclature used in Reports of the Ontario Diision of Mines; Ontario Div. Mines, MP52, 14p.

Bond, W.D.

1974: Houghton-Hough Lakes Area, District of Thunder Bay, Ontario, Div. Mines, Prelim Map P.933, Geol. Ser. Scale 1 inch to 1/4 mile. Geology 1973.

1977: McCubbin, Poisson and McGillis Townships (Savant Lake Area) District of Thunder Bay, Geoscience Report 160. Accompanied by Map 2357, Scale 1 inch to 50 miles.

1979: Conant, Jutten and Smye Townships (Savant Lake Area) District of Thunder Bay. Ontario Geological Survey Report 182 accompanied by Map 2398. Scale: 1 inch to 50 miles.

Breaks, F.W., Bord, W.D., and Stone, Denver

1978: Preliminary Geological Synthesis of the English River Subprovince: Northwestern Ontario and its Bearing Upon Mineral Exploration. Ontario Geol. Survey Misc. Paper 72.

Collins, W.H.

In the interest of rapid dissemination of the results contained in this Report, some of the data may not have been meticulously checked. Thus the OGS does not guarantee the accuracy of these figures and suggests the reader check original sources.

1907: On Surveys along the National Transcontinental Railway location between Lake Nipigon and Lac Seul, Ontario; Can. Geol. Surv. Summary Report for 1906, p.103-109. Accompanied by Map No. 993, Scale 1 inch to 4 miles.

Davies, J.C., Pryslak, A.P. and Pye, E.G.

1970: "Sioux Lookout-Armstrong Sheet - Geological Compilation Series" Ontario Dept. of Mines Map 2169.

Funk, Gunther H.

1973: Petrographic and Chemical Study of Granitoid Phenocrysts from Selected Archean Conglomerates; Unpub. B.Sc. Thesis, Brock University, St. Catharines, Ontario, 36p.

Hudec, P.P.

1959: Highstone Lake-Miniss Lake Area, Districts of Kenora and Thunder Bay; Ontario Dept. of Mines Preliminary Map P.54, Geol. Ser. Scale 1 inch to 1 mile. Geology 1959.

Irvine, T.N. and Baragar, W.R.A.

1971: A guide to the chemical classification of the common volcanic rocks; Can. J. Earth Sci., Vol. 8, No.5, p.523-548.

In the interest of rapid dissemination of the results contained in this Report, some of the data may not have been meticulously checked. Thus the OGS does not guarantee the accuracy of these figures and suggests the reader check original sources.

Mackasey, W.O., Blackburn, C.E., and Trowell, N.F.

1974: A Regional Approach to the Wabigon-Quetico Belts and its Bearing on Exploration in Northwestern Ontario. Ministry of Natural Resources MP 58.

Moore, E.S.

1970: Lake Savant Iron Range Area. Ont. Bureau of Mines, Vol. 19, Part I, pp. 173-193. Accompanied by Map of the Lake Savant Iron Range P.722. Scale: 1 inch to 2 miles.

1928: Lake Savant Area, District of Thunder Bay. Ont. Dept. of Mines, Vol. 37, Part 4, p.52-82 (published 1929). Accompanied by Map 37J. Scale: 1 inch to 2 miles.

ODM-GSC

1961a: Kashaweogama Lake, Kenora and Thunder Bay Districts, Ontario; Ontario Dept. Mines - Geol. Surv. Canada. Aeromagnetic Map 1119C, Scale 1 inch to 1 mile. Survey May to October, 1961.

1961b: Schist Lake, Kenora District, Ontario; Ontario Dept. Mines - Geol. Surv. Canada, Aeromagnetic Map 1129G, Scale 1 inch to 1 mile. Survey May to October, 1961.

In the interest of rapid dissemination of the results contained in this Report, some of the data may not have been meticulously checked. Thus the OGS does not guarantee the accuracy of these figures and suggests the reader check original sources.

Prest, V.K., Grant, D.R. and Rampton, V.N.

1967: "Glacial Map of Canada" Can. Geol. Surv. Map 1253A compiled 1964-1966.

Prest, V.K.

1970: Quaternary Geology of Canada; p. 676-761 in Can. Geol. Surv., Econ. Geol. Rept. 1. Edited by R.J.W. Douglas, Geology and Economic Minerals of Canada. 838p.

Rittenhouse, Gordon

1936: Geology of a Portion of the Savant Lake Area; Ontario. Jour. Geol. Vol. 44, p. 451-478. Map Scale: 1 inch to 1/2 mile in O.D.M. Resident Geologist's Files in Kenora, Ontario.

Skinner, R.

1969: Geology of Sioux Lookout Map-Area, Ontario, a Part of the Superior Province of the Precambrian Shield (52J); Geol. Surv. Canada Paper 68-45. Accompanied by Map 14-1968. Scale 1 inch to 4 miles.

Sutcliffe, R.

In the interest of rapid dissemination of the results contained in this Report, some of the data may not have been meticulously checked. Thus the OGS does not guarantee the accuracy of these figures and suggests the reader check original sources.

1977: "Savant Lake Area" in "Savant Lake-Crow Lake Special Project Districts of Thunder Bay and Kenora Trowell et al. in Summary of Field Work 1977, Ont. Geol. Surv. Misc. Paper 75.

Trusler, J.R.

1975: Farrington Lake Area, District of Kenora; Ontario, Div. Mines, Prelim Map P.996. Scale 1:15 840.

Zoltai

1965: Kenora-Rainy River, Surficial Geology; Ontario Dept. Lands and Forests, Map S165. 1 inch to 8 miles. Geology 1958-1960.

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TABLE 1

TABLE OF LITHOLOGIC UNITS FOR THE FARRINGTON LAKE AREA

PHANEROZOIC
CENOZOIC
QUATERNARY
PLEISTOCENE AND RECENT
Silt, sand, gravel, muck

UNCONFORMITY

PRECAMBRIAN
EARLY PRECAMBRIAN (ARCHEAN)
FELSIC TO INTERMEDIATE INTRUSIVE ROCKS
Equigranular and porphyritic trondhjemite; granodorite; quartz monzonite; foliated to banded porphyritic quartz monzonite; and derived augen gneisses and schist; granite; aplite; pegmatite; migmatite; hybrid trondhjemite; diorite.

METAMORPHOSED MAFIC TO INTERMEDIATE INTRUSIVE ROCKS
Diorite, quartz diorite, hornblende trondhjemite, gabbro, amphibolite.

METASEDIMENTS
CONGLOMERATIC ROCKS
Polymictic orthoconglomerate; derived schists and gneisses
ARENACEOUS AND ARGILLACEOUS ROCKS
Cherty siltstone and mudstone, feldspathic lithwacke; siltstone, mudstone; ferruginous, tuffaceous metasediments.

METAVOLCANICS
FELSIC METAVOLCANICS
Rhyolitic to dacitic flows; tuffs, lapilli tuffs, tuff-breccias; crystal tuff; quartz, quartz feldspar, and feldspar porphyry.

INTERMEDIATE METAVOLCANICS
Dacitic and andesitic quartz feldspar porphyry; tuff, lapilli-tuff, tuff breccia; crystal tuff; flow breccia

MAFIC TO ULTRAMAFIC METAVOLCANICS
Massive, to porphyritic, to amygdaloidal, to pillowed mafic flows and derived amphibolites; mafic tuff, lapilli-tuff, tuff breccia; maffic flow breccia; talc-carbonate-tremolite-actinolite rock; serpentinite.

TABLE 2 HISTORY OF STRATIGRAPHIC NOMENCLATURE USED FOR FARRINGTON LAKE AREA

Moore, E.S. (1928)	Rittenhouse (1936)	Skinner (1969)	Present Survey
PRECAMBRIAN:			
EWEENAWAN: Diabase dikes	KEWEENAWAN(?) - Diabase dikes	KEWEENAWAN(?) - Diabase dikes	
LGOMAN: Granitic Intrusives	Granitic Intrusives	Granitic Intrusives, gneisses	LATE FELSIC INTRUSIVE ROCKS
	BASIC INTRUSIVES		MAFIC INTRUSIVE ROCKS
	HANDY LAKE VOLCANICS Felsic to Intermediate Metavolcanics	HANDY LAKE VOLCANICS	
	UNCONFORMITY		
IMISKAMING: Complex series of interbanded acid, intermediate and basic lava flows, agglomerate, tuffs arkoses, greywacke, banded iron formation and conglomerate and derived gneisses.	Upper Greywacke member	TIMISKAMING(?) Metasediments	
	Upper Iron-bearing member	Pyroclastics	FELSIC, INTERMEDIATE AND MAFIC METAVOLCANICS; CLASTIC METASEDIMENTS
	Lower Greywacke member		
	Lower Iron-bearing member		CONGLOMERATE
	Upper Conglomerate member		EARLY FELSIC INTRUSIVE ROCKS
	Lower Conglomerate member		
EEWATIN: Greenstones, intermediate to mafic	JUTTEN VOLCANICS: Mafic to intermediate	GREENSTONE: Mafic to intermediate	MAFIC METAVOLCANICS

Table 5 : Analyses of Intermediate Metavolcanic Upper Metavolcanic Sequence, Predominantly Andesite.

Chemical Analyses, Major Components in Weight Percent

Sample No:	40053A	40076A	40084	40088	40089	42139C
SiO2	68.1 X	68.1 X	65.0 X	62.8 X	63.4 X	63.1 X
Al2O3	15.7 X	16.5 X	17.6 X	16.6 X	15.0 X	15.0 X
Fe2O3	1.44 X	3.70 X	4.10X	5.00X	4.40X	6.30 X
FeO	2.19 C	.00	.00	.00	.00	.00
MgO	1.02 X	2.30 X	1.40X	2.40X	2.70X	3.20 X
CaO	4.18 X	3.50 X	3.20X	4.80X	4.70X	7.00 X
Na2O	4.91 C	3.21 C	5.01C	3.91C	3.48C	2.62 C
K2O	1.16 C	1.95 C	1.33C	.70C	.89C	.29 C
TiO2	.41 X	.40	.50X	.50X	.50X	.60 X
P2O5	.07 C	.00	.00	.00	.00	.00
S	.00 C	.00	.00	.00	.00	.00
MnO	.08 X	.00	.00	.00	.00	.00
Co2	.10 C	.00	.00	.00	.00	.00
H2O+	.16 C	.00	.00	.00	.00	.00
H2O-	.40 C	.00	.00	.00	.00	.00
TOTAL	99.9	90.7	98.1	96.7	95.1	98.1
Molecular Norms						
AP	.148	.000	.000	.000	.000	.000
PO	.000	.000	.000	.000	.000	.000
IL	.577	.564	.709	.725	.739	.870
OR	6.926	11.683	8.002	4.311	5.588	1.786
AB	44.500	29.467	45.758	36.549	33.166	24.493
AN	17.542	17.593	16.153	24.799	24.081	29.488
C	.000	2.980	2.333	.777	.000	.000
AC	.000	.000	.000	.000	.000	.000
MT	1.520	2.012	2.127	2.177	2.220	2.286
HM	.000	.000	.000	.000	.000	.000
WO	.000	.000	.000	.000	.000	.000
EN	2.148	6.432	3.932	6.898	7.681	7.293
FS	1.483	.636	.851	2.178	2.291	2.935
Q	22.810	28.632	20.135	21.586	20.691	25.505
DI	1.388	.000	.000	.000	1.463	3.810
FO	.000	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000	.000
ME	.000	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000	.000
HE	.958	.000	.000	.000	.078	1.533
CC	.000	.000	.000	.000	.000	.000
RD	.000	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000	.000
Normative Plagioclase composition	28.27	37.38	26.09	40.42	42.06	54.63

Sample Number	Rock Description	Location Longitude	Latitude
40053A	Dark green feldspar porphyry	90°58'06"W	50°20'41"N
40076A	Grey, medium-grained volcanic flow.	90°58'29"W	50°20'34"N
40084	Grey, fine to medium grained porphyry.	90°58'51"W	50°20'47"N
40088	Grey, fine-grained volcanic flow.	90°59'57"W	50°20'51"N
40089	Volcanic breccia	90° 59'50"W	50°20'18"N
42139C	Dark grey feldspar porphyry.	90°59'35"W	50°30'22"N

TABLE 6 : Analyses of Intermediate Metavolcanics, Upper Metavolcanic Sequence; Predominantly Andesite

Chemical Analyses, Major Components in Weight Percent

Sample No:	42160		40179		40255		40183A		40183B	
SiO2	63.6	X	62.9	X	65.8	X	60.8	X	68.4	X
AL203	16.7	X	14.9	X	17.0	X	17.6	X	15.8	X
FE203	1.71	C	1.75	X	1.03	X	4.50	X	1.33	X
FEO	3.48	X	3.65	C	2.51	C	.00		2.59	C
MGO	2.71	X	1.95	X	1.12	X	2.30	X	.91	X
CAO	4.99	X	5.71	X	3.92	X	5.20	X	4.43	X
NA20	3.48	C	3.64	C	4.04	C	3.69	C	3.72	C
K20	1.50	C	1.23	C	1.98	C	1.06	C	1.26	C
TI02	.55	X	.62	X	.60	X	.40	X	.52	X
P205	.07	C	.12	C	.11	C	.00		.07	C
S	.00	C	.01	C	.00	C	.00		.0[illegible]	C
MNO	.08	X	.12	X	.08	X	.00		.09	X
CO2	.25	C	1.80	C	1.35	C	.00		.70	C
H20+	.96	C	.80	C	.49	C	.[illegible]0		.28	C
H20-	.40	C	.38	C	.32	C	.0		.40	C
TOTAL	100.5		99.6		100.4		95.6		100.5	
SPEC. GR.	2.74		2.73		2.71				2.69	

Molecular Norms

AP	.149	.263	.236	.000	.150
PO	.000	.036	.000	.000	.000
IL	.700	.904	.855	.586	.740
OR	9.030	7.613	11.978	6.588	7.616
AB	1.803	34.199	37.101	34.815	34.134
AN	24.739	21.650	19.160	27.116	21.998
C	.496	.000	1.504	1.065	.480
AC	.000	.000	.000	.000	.000
MT	1.820	1.915	1.101	2.088	1.421
HM	.000	.000	.000	.000	.000
WO	.000	.000	.000	.000	.000
EN	7.615	3.936	3.163	6.673	2.568
FS	3.622	2.724	2.517	1.832	2.557
	19.946	21.017	22.386	19.238	28.335
DI	.000	3.394	.000	.000	.000
FO	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000
NE	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000
HE	.000	2.340	.000	.000	.000
CC	.000	.000	.000	.000	.000
RU	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000
AS	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000

Normative Plagioclase Composition	43.75	38.77	34.06	43.78	39.19

Sample No:	Rock Description	Location Longitude	Latitude
4216	Medium grey feldspar porphyry.	90°51'34"W	50°20'25"N
40179	Intermediate volcanic flow.	90°01'49"W	50°21'11"N
40255	Medium grey volcanic flow.	90°01'08"W	50°20'58"N
40183A	Intermediate feldspar porphyry.	91°02'55"W	50°20'23"N
40183B	Feldspar porhyyry	91°02'56"W	50°20'22"N

TABLE 7 : Analyses of Intermediate Metavolcanics, Upper Metavolcanic Sequence; Predominantly Andesite

Chemical Analyses, Major Components in Weight Percent

Sample No:	42007B		42008		42024		40153A		40456A		40396	
SI02	58.2	X	69.4	X	60.6	X	54.8	X	59.2	X	62.1	X
AL203	16.3	X	13.6	X	15.9	X	16.9	X	14.9	X	15.4	X
FE203	6.60	X	4.40	X	7.50	X	8.50	X	5.30	X	6.60	X
FEO	.00		.00		.00		.00		.00		.00	
MGO	2.70	X	1.90	X	2.30	X	5.30	X	2.90	X	3.20	X
CAO	5.90	X	2.50	X	4.50	X	3.30	X	6.70	X	4.10	X
NA20	2.80	C	3.26	C	3.45	C	3.48	C	3.45	C	3.61	C
K20	.92	C	1.23	C	.89	C	.12	C	.12	C	.53	C
TIO2	.70	X	.40	X	.40	X	.90	X	.50	X	.10	X
P205	.00		.00		.00		.00		.00		.00	
S	.00		.00		.00		.00		.00		.00	
MNO	.00		.		.00		.00		.00		.00	
CO2	.00		.00		.00		.00		.00		.00	
H2O+	.00		.00		.00		.00		.00		.00	
H2O-	.00		.00		.00		.00		.00		.00	
TOTAL:	94.1		96.7		95.5		93.3		93.1		95.6	

Molecular Norms:

AP	.000	.000	.000	.000	.000	.000
PO	.000	.000	.000	.000	.000	.000
IL	1.054	.587	.594	1.352	.756	.147
OR	5.883	7.667	5.607	.765	.770	3.314
AB	27.181	30.847	32.994	33.690	33.621	34.263
AN	31.569	13.074	23.785	17.657	26.945	21.507
C	.000	2.715	1.255	5.941	.000	1.655
AC	.000	.000	.000	.000	.000	.000
MT	2.487	2.094	2.116	2.706	2.270	1.768
HM	.000	.000	.000	.000	.000	.000
WO	.000	.000	.000	.000	.000	.000
EN	8.036	5.528	6.763	15.777	5.906	9.339
FS	3.908	1.690	6.311	6.013	1.851	6.042
Q	19.811	35.797	20.575	16.098	20.567	21.964
DI	.046	.000	.000	.000	5.568	.000
FC	.000	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000	.000
NE	.000	.000	.000	. 00	.000	.000
LC	.000	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000	.000
HE	.022	.000	.000	.000	1.745	.000
CC	.000	.000	.000	.000	.000	.000
RU	.000	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000	.000

Normative Plagioclase composition	53.73	29.77	41.89	34.39	44.49	38.56

Sample No:	Rock Description	Location Longitude	Latitude
42007B	Light green, intermediate volcanic flows.	91°09'37"W	50°20'45"N
42008	Light grey fragmental volcanic.	91°09'36"W	50°20'27"N
42024	Light green feldspar porphyry	91°09'16"W	50°20'30"N
40153A	Light grey, medium grained volcanic flow.	91°08'55"W	50°20'37"N
40156A	Medium-grey, fragmental feldspar porphyry	91°08'55"W	50°20'14"N
40396	Medium-grey feldspar porphyry.	91°08'22"W	60°20'47"N

TABLE 8 : Analyses of Intermediate Metavolcanics, Upper Metavolcanic Sequence; Predominantly Andesite

Chemical Analyses, Major Components in Weight Percent

Sample No:	40018A		40398		40399A	
SI02	52.7	X	59.4	X	64.3	X
AL203	21.3	X	16.8	X	15.8	X
FE203	10.0	X	8.20	X	4.90	X
FEO	.00		.00		.00	
MGO	3.80	X	3.80	X	1.70	X
CAO	2.80	X	2.70	X	3.90	X
NA20	5.66	C	4.56	C	3.94	C
K20	.48	C	.34	C	1.28	C
TI02	1.10	X	.70	X	.50	X
P205	.00		.00		.00	
S	.00		.00		.00	
MNO	.00		.00		.00	
CO2	.00		.00		.00	
H20+	.00		.00		.00	
H20-	.00		.00		.00	
TOTAL:	97.8		96.5		96.3	

Molecular Norms

AP	.000	.000	.000
PO	.000	.000	.000
IL	1.555	1.015	.730
OR	2.881	2.093	7.938
AB	51.561	42.613	37.090
AN	14.098	13.945	20.291
C	7.067	4.571	.964
AC	.000	.000	.000
MT	2.758	2.394	2.192
HM	.000	.000	.000
WO	.000	.000	.000
EN	10.646	10.919	4.921
FS	7.073	6.095	2.047
Q	2.363	16.355	23.827
DI	.000	.000	.000
FC	.000	.000	.000
FA	.000	.000	.000
NE	.000	.000	.000
LC	.000	.000	.000
KP	.000	.000	.000
HE	.000	.000	.000
CC	.000	.000	.000
RU	.000	.000	.000
NS	.000	.000	.000
KS	.000	.000	.000
CR	.000	.000	.000
LN	.000	.000	.000

Normative Plagioclase Composition	21.47	24.66	35.36

Sample Number	Rock Description	Location Longitude	Latitude
40018A	Grey, medium-grained feldspar porphyritic flow.	91°08'25"W	50°21'14"N
40398	Intermediate feldspar porphyry.	91°08'43"W	50°20'50"N
40399A	Intermediate feldspar porphyritic flow.	91°08'43"W	50°20'57"N

TABLE 9 : Analyses of Felsic Metavolcanics, Upper Metavolcanic Sequence

Chemical Analyses, Major Components in Weight Percent						
Sample No:	40034	40035	40036	40055	40086	40259B
SI02	75.7 X	79.8 X	74.4 X	75.8 X	76.8 X	78.0 X
AL203	11.0 X	10.1 X	12.9 X	13.4 X	11.1 X	12.4 X
FE203	4.20 X	.93 X	3.50 X	3.80 X	2.80 X	1.70 X
FEO	.00	1.06 C	.00	.00	.00	.00
MGO	.40 X	.53 X	.50 X	.30 X	.20 X	.10 X
CAO	.20 X	.54 X	.20 X	.20 X	1.10 X	.50 X
NA20	1.54 C	3.94 C	4.18 C	3.32 C	4.07 C	4.53 C
H20	2.55 C	1.40 C	1.81 C	2.29 C	1.86 C	1.69 C
TI02	.30 X	.20 X	.40 X	.40 X	.20 X	.10 X
P205	.00	.02 C	.00	.00	.00	.00
Q	.00	.01 C	.00	.00	.00	.00
MNO	.00	.04 X	.00	.00	.00	.00
CO2	.00	.80 C	.00	.00	.00	.00
H20+	.00	.11 C	.00	.00	.00	.00
H20-	.00	.41 C	.00	.00	.00	.00
TOTAL:	96.0	99.9	97.9	99.5	98.1	99.0
Molecular Norms						
AP	.000	.043	.000	.000	.000	.000
PO	.000	.036	.000	.000	.000	.000
IL	.455	.288	.579	.574	.290	.142
CR	18.431	8.571	11.123	13.957	11.433	10.220
AB	15.063	36.616	38.992	30.715	37.978	41.585
AK	1.081	2.638	1.031	1.023	5.673	2.537
C	6.352	1.321	4.197	5.731	.443	2.466
AC	.000	.000	.000	.000	.000	.000
MT	2.050	1.006	2.064	2.047	1.847	.000
HM	.000	.000	.000	.000	.000	1.140
WC	.000	.000	.000	.000	.000	.000
EN	1.203	1.515	1.434	.853	.574	.282
FS	1.823	.769	.362	.790	.073	.000
Q	55.542	47.196	40.217	44.310	41.690	41.628
DI	.000	.000	.000	.000	.000	.000
FO	.000	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000	.000
NE	.000	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000	.000
HE	.000	.000	.000	.000	.000	.000
CC	.000	.000	.000	.000	.000	.000
RU	.000	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000	.000
Normative Plagioclase Composition	6.70	6.72	2.58	3.22	13.00	5.75

Description and location of analysed samples of Felsic Metavolcanics:

Sample No:	Rock Description	Location Longitude	Latitude
40034	Pale buff to pinkm very fine grained rhyolite porphyry.	90°57'52"W	50°22'22"N
40035	Bedded, quartz-feldspar porphyry (rhyolite) tuff.	90°57'55"W	50°22'20"N
40036	Quartz-feldspar rhyolite porphyry.	90°57'54"W	50°22'16"N
40055	Quartz-feldspar rhy9lite porphyry.	90°58'14"W	50°22'14"N
40086	Light green, bedded, rhyolite porphyry.	90°58'28"W	50°22'19"N
40259B	Quartz-feldspar rhyolite porphyry.	91°01'08"W	50°21'30"N

TABLE 10 : Analyses of Southern Dacite Crystal[40] Tuff, Upper Metavolcanic Sequences

Chemical Analyses, Major Components in Weight Percent

Sample No.	40072	40186	40242	40299B	42200
SIO2	70.9 X	64.1 X	69.8 X	67.8 X	64.4 X
AL203	16.8 X	17.1 X	15.9 X	18.4 X	17.8 X
FE203	2.10 X	3.80 X	3.70 X	2.00 X	2.70 X
FEO	.00	.00	.00	.00	.00
MGO	.80 X	1.30 X	1.50 X	1.00 X	.70 X
CAO	3.30 X	2.70 X	2.10 X	3.60 X	2.50 X
NA20	4.56 C	3.61 C	5.45 C	3.56 C	3.75 C
K2O	2.22 C	2.39 C	1.25 C	1.69 C	1.88 C
TIO2	.30 X	.30 X	.30 X	.30 X	.10 X
P205	.00	.00	.00	.00	.00
S	.00	.00	.00	.00	.00
MNO	.00	.00	.00	.00	.00
CO2	.00	.00	.00	.00	.00
H20+	.00	.00	.00	.00	.00
H20-	.00	.00	.00	.00	.00
TOTAL:	101.0	95.3	100.0	98.4	93.8

Molecular Norms

AP	.000	.000	.000	.000	.000
PO	.000	.000	.000	.000	.000
IL	.414	.441	.417	.285	.149
OR	13.016	14.930	7.377	10.217	11.900
AB	40.585	34.233	48.826	32.671	36.033
AN	18.233	14.151	10.398	18.260	13.277
C	.968	4.225	1.921	4.651	5.900
AC	.000	.000	.000	.000	.000
MT	.000	1.988	1.878	.000	1.790
HM	1.243	.000	.000	1.282	.000
WO	.000	.000	.000	.000	.000
EN	2.189	3.791	4.132	2.822	2.068
FS	.000	1.178	.974	.000	.298
Q	25.349	25.064	24.076	29.741	28.583
DI	.000	.000	.000	.000	.000
FC	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000
NE	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000
KF	.000	.000	.000	.000	.000
HE	.000	.000	.000	.000	.000
CC	.000	.000	.000	.000	.000
RU	.000	.000	.000	.071	.000
NS	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000

Normative Plagioclase Composition	28.57	29.25	17.56	35.85	26.93

Sample Number	Rock Description	Location Longitude	Latitude
40072	Felsic tuff	91°02'15"W	50°19'54"N
40186	Light grey, fragmental feldspar porphyry.	91°02'45"W	50°20'05"N
40242	Light grey medium-grained feldspar porphyritic flow.	91°02'35"N	50°20'05"N
40249B	Feldspar porphyritic flow	91°02'50"W	50°19'47"N
42200	Light grey, very fine-grained felsic volcanic.	91°03'01"W	50°20'04"N

TABLE 11 : Analyses of Dacitic 40 Rhyolitic Crystal Tuffs South of Schist Lake, Dacitic Portion, Upper Metavolcanic Sequence

Chemical Analyses, Major Components in Weight Percent

Sample No:	40381	40384A	40300	40385	40023	40383
SI02	76.9 X	74.4 A	75.1 X	72.2 A	77.4 X	75.8 A
AL203	12.0 X	11.7 A	13.0 X	13.6 A	11.7 X	12.1 A
FE203	1.70 X	1.15 A	1.80X	.57A	2.40 X	1.66 A
FEO	.00	2.84 C	.00	2.19C	.00	1.30 C
MGO	.60 X	1.10 A	.40X	1.00A	.30 X	1.50 A
CAO	.80 X	2.00 A	1.80X	3.90A	.40 X	1.30 A
NA20	1.51 C	2.05 C	2.99C	2.40C	2.94 C	.97 C
K20	2.82 C	1.61 C	2.41C	1.18C	1.57 C	1.95 C
TIO2	.20 X	.30 A	.10X	.61A	.30 X	.37 A
P205	.00	.04 C	.00	.05C	.00	.02 C
S	.00	.01 C	.00	.01C	.00	.01 C
MNO	.00	.05 A	.00	.05A	.00	.03 A
CO2	.00	.16 C	.00	.54C	.00	.14 C
H20+	.00	.45 C	.00	.51C	.00	1.47 C
H20-	.00	.46 C	.00	.37C	.00	.55 C
TOTAL:	96.5	98.3	97.6	99.2	97.0	99.2

Molecular Norms:

AP	.000	.089	.000	.110	.000	.045
PO	.000	.037	.000	.036	.000	.037
IL	.000	.444	.146	.892	.443	.552
CH	17.873	10.123	14.905	7.324	9.848	12.361
AB	14.528	14.566	28.071	27.613	27.994	9.334
AN	4.254	10.272	9.340	19.965	2.105	6.773
C	5.857	3.532	2.509	1.608	5.136	7.109
AC	.000	.000	.000	.000	.000	.000
MI	.000	1.278	.219	.625	.666	1.860
HM	1.270	.000	1.020	.000	.887	.000
WO	.000	.000	.000	.000	.000	.000
EN	1.775	3.228	1.155	2.897	.878	4.438
FS	.000	3.427	.000	2.298	.000	.379
Q	54.295	48.004	42.636	41.632	52.043	57.110
DI	.000	.000	.000	.000	.000	.000
FO	.000	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000	.000
NE	.000	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000	.000
HE	.000	.000	.000	.000	.000	.000
CC	.000	.000	.000	.000	.000	.000
RU	.149	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000	.000
CR	.000	.000	.000	.-00	.000	.000
LN	.000	.000	.000	.000	.000	.000

Normative Plagioclase Composition	22.65	34.43	24.97	46.89	6.99	42.05

Sample Number	Rock Description	Location Longitude	Latitude
40381	Quartz feldspar porphyry tuff.	91°12'16"W	50°21'46"N
40384A	Quartz feldspar porphyry	91°11'20"W	50°21'55"N
40300	Felsic tuff	91°10'58"W	50°21'55"N
40385	Quartz-feldspar phyric tuff.	91°11'18"W	50°21'53"N
40023	Quartz-feldspar phyric tuff.	91°08'25"N	50°21'47"N
30383	Quartz-feldspar phyric tuff.	91°12'18"W	50°21'43"N

TABLE 12 : Analyses of Dacitic to Rhyolitic Crystal Tuff of Schist Lake, Rhyolitic Portion, Upper Metavolcanic Sequence.

Chemical Analyses, Major Compoennts in Weight Percent.

Sample No.	44146C		44108A		44107		40379		40302	
SIO2	79.8	X	76.4	X	79.4	X	77.4	X	75.1	X
AL203	12.2	X	12.5	X	11.8	X	11.9	X	12.3	X
FE203	1.00	X	3.40	X	1.70	X	2.70	X	4.10	X
FEO	.00		.00		.00		.00		.00	
MGO	.40	X	.70	X	.40	X	1.30	X	.60	X
CAO	.70	X	1.70	X	1.20	X	.60	X	.80	X
NA20	3.18	C	3.45	C	3.18	C	2.24	C	3.83	C
K20	1.86	C	1.71	C	1.16	C	1.71	C	1.90	C
TI02	.10	X	.20	X	.10	X	.10	X	.10	X
P205	.00		.00		.00		.00		.00	
S	.00		.00		.00		.00		.00	
MNO	.00		.00		.00		.00			
CO2	.00		.00		.00		.00		.00	
H20+	.00		.00		.00		.00		.00	
H20-	.00		.00		.00		.00		.00	
TOTAL:	99.2		100.1		98.9		98.0		98.7	

Molecular Norms:

AP	.000	.000	.000	.000	.000
PO	.000	.000	.000	.000	.000
IL	.000	.285	.144	.147	.144
COR	11.323	10.343	7.109	10.639	11.626
AB	29.387	31.675	29.585	21.155	35.574
AN	3.575	8.626	6.170	3.132	4.107
C	4.137	2.101	3.542	6.054	2.809
AC	.000	.000	.000	.000	.000
MT	.000	1.818	.000	1.760	1.731
HM	.717	.000	1.156	.000	.000
WO	.000	.000	.000	.000	.000
EN	1.137	1.976	1.144	3.775	1.714
FS	.000	.927	.000	.293	2.308
Q	49.652	42.250	51.149	53.046	39.988
DI	.000	.000	.000	.000	.000
FO	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000
NE	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000
HE	.000	.000	.000	.000	.000
CC	.000	.000	.000	.000	.000
RU	.072	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000

Normative Plagioclase Composition	10.85	21.40	17.26	12.90	10.35

Sample Number	Rock Description	Location Longitude	Latitude
44146C	Intermediate volcanic flow	90°12'38"W	50°21'48"N
44108A	Felsic quartz-feldspar porphyry.	90°12'55"W	50°21'42"N
44107	Felsic quartz-feldspar porphyry.	91°13'02"W	50°21'42"N
40379	Quartz-feldspar phyric crystal tuff.	91°13'13"W	50°21'43"N
40302	Grey, quartz-feldspar tuff	91°13'37"W	50°21'43"N

TABLE 13 : Analyses of Intermediate Metavolcanics, Upper Metavolcanic Sequence; Predominantly Rhyolite

Chemical Analyses, Major Components in Weight Percent

Sample No:	40395	40155	40198	40202B	40209B	40118
SI02	76.2 X	58.5 X	66.0 X	75.7 X	75.4 X	74.7 X
AL203	13.2 X	18.7 X	13.6 X	12.1 X	11.5 X	12.1 X
FE203	2.70X	5.40X	6.20X	2.70X	4.10X	3.20X
FEO	.00	.00	.00	.00	.00	.00
MGO	1.40X	2.90X	1.30X	.70X	.60X	.60X
CAO	2.00X	6.80X	4.10X	1.20X	1.20X	1.00X
NA20	2.62C	2.78C	3.91C	2.86C	3.13C	3.13C
K20	1.59C	1.08C	.67C	1.86C	2.12C	1.59C
TI02	.30X	.50X	.90X	.30X	.20X	.20X
P205	.00	.00	.00	.00	.00	.00
S	.00	.00	.00	.00	.00	.00
MNO	.00	.00	.00	.00	.00	.00
CO2	.00	.00	.00	.00	.00	.00
H20+	.00	.00	.00	.00	.00	.00
H20-	.00	.00	.00	.00	.00	.00
TOTAL	100.0	96.7	96.7	97.4	98.3	96.5
SPEC. GR.						

Molecular Norms:

AP	.000	.000	.000	.000	.000	.000
PO	.000	.000	.000	.000	.000	.000
IL	.428	.728	1.325	.440	.292	.296
OR	9.637	6.673	4.189	11.591	13.125	9.995
AB	24.106	26.072	37.108	27.055	29.415	29.867
AN	10.170	35.247	18.588	6.274	6.233	5.274
C	3.551	.678	.000	3.680	2.140	3.958
AC	.000	.000	.000	.000	.000	.000
MT	1.286	2.184	2.652	1.322	1.860	1.889
HM	.420	.000	.000	.440	.000	.000
WO	.000	.000	.000	.000	.000	.000
EN	3.961	8.363	3.091	2.036	1.734	1.760
FS	.000	2.767	2.042	.000	1.970	.667
Q	46.032	17.288	28.671	47.160	43.231	46.294
DI	.000	.000	1.406	.000	.000	.000
FO	.000	.000	.000	.000	.000	.000
FA	.000	.000	.000	.000	.000	.000
NE	.000	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000	.000
RE	.000	.000	.929	.000	.000	.000
CC	.000	.000	.000	.000	.000	.000
RU	.000	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000	.000

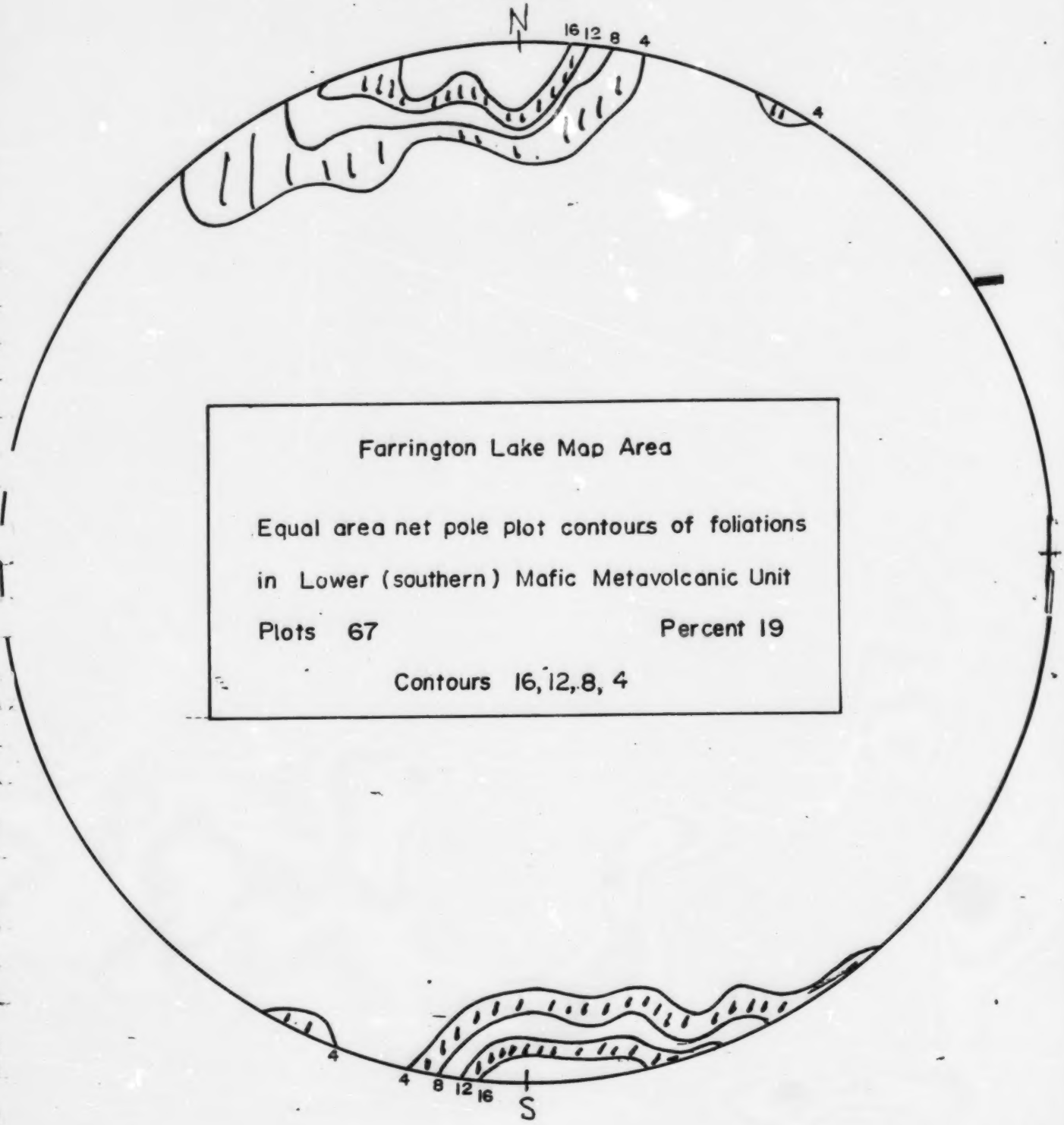
Normative Plagioclase Composition	29.67	57.48	33.37	18.82	17.48	15.01

Sample Number	Rock Description	Location Longitude	Latitude
40395	Light grey, fine to medium grained felds porphyry.	91°08'10"W	50°20'55"N
40155	Light to medium grey felds-par porphyry.	91°08'47"W	50°20'32"N
40119B	Grey, feldspar porphyritic flow.	91°06'05"W	50°21'22"N
400202B	Quartz-felds porphyry	91°06'42"W	50°21'22"N
40209B	Quartz-felds porphyry	91°06'59"W	50°21'23"N
40118	Grey feldspar porphyry	91°06'02"W	50°21'26"N

TABLE 14 : Matrix Mineral Assemblages in Felsic and Intermediate Volcanics.

Metamorphic Facies	Andesite and Dacite	Rhyolite
Lower Greenschist	albite epidote chlorite muscovite quartz magnetite	quartz albite muscovite carbonate epidote magnetite
Middle Greenschist	epidote albite chlorite quartz biotite magnetite	quartz albite biotite muscovite carbonate epidote magnetite
Upper Greenschist	albite biotite amphibole or uralite epidote carbonate magnetite	
Almandine Amphibolite	oligoclase hornblende biotite epidote carbonate	

Figure 2



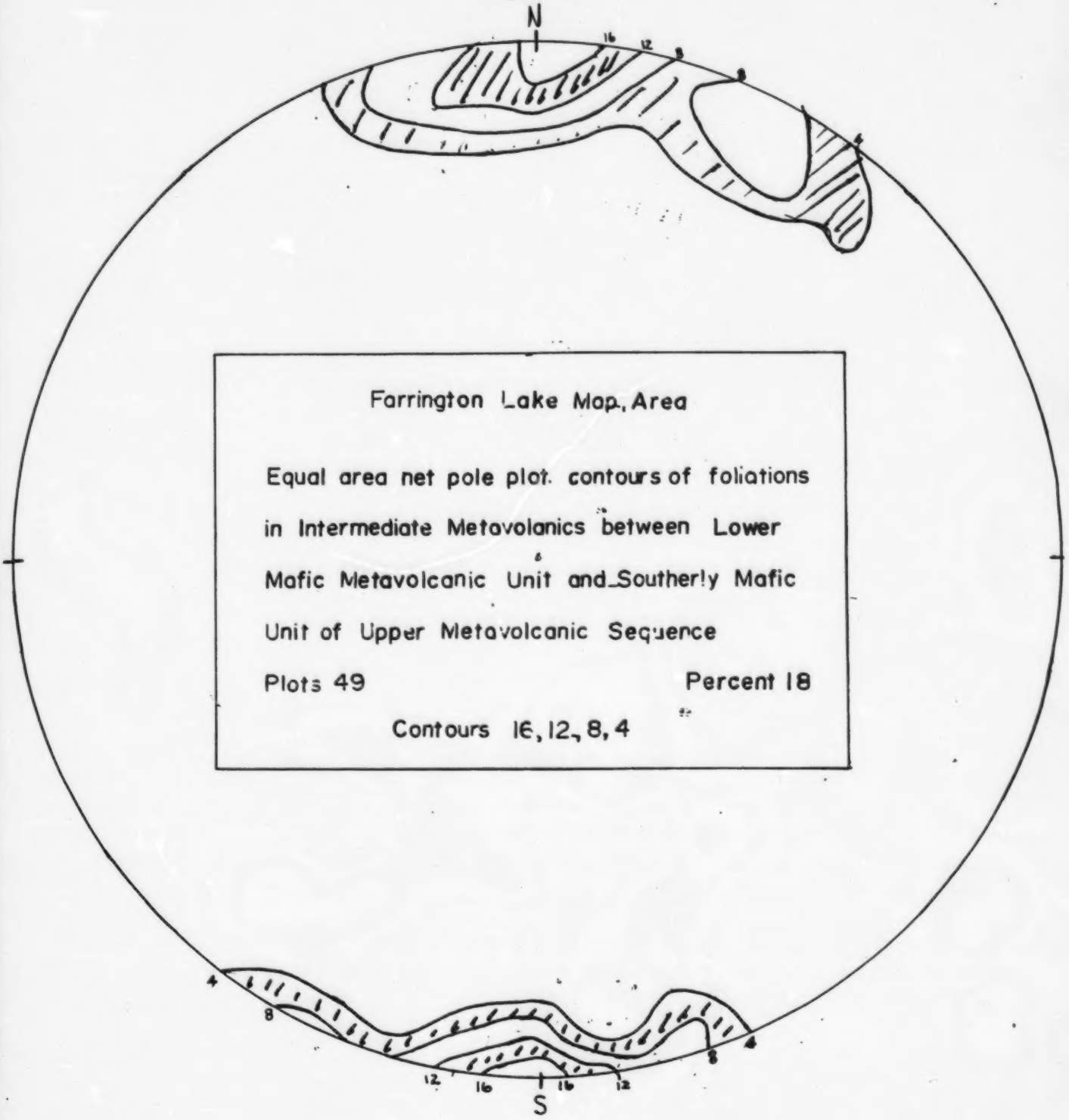
Farrington Lake Map Area

Equal area net pole plot contours of foliations in Lower (southern) Mafic Metavolcanic Unit

Plots 67 Percent 19

Contours 16, 12, 8, 4

Figure 3



Farrington Lake Map Area

Equal area net pole plot. contours of foliations in Intermediate Metavolanics between Lower Mafic Metavolcanic Unit and Southerly Mafic Unit of Upper Metavolcanic Sequence

Plots 49 Percent 18

Contours 16, 12, 8, 4

Figure 4

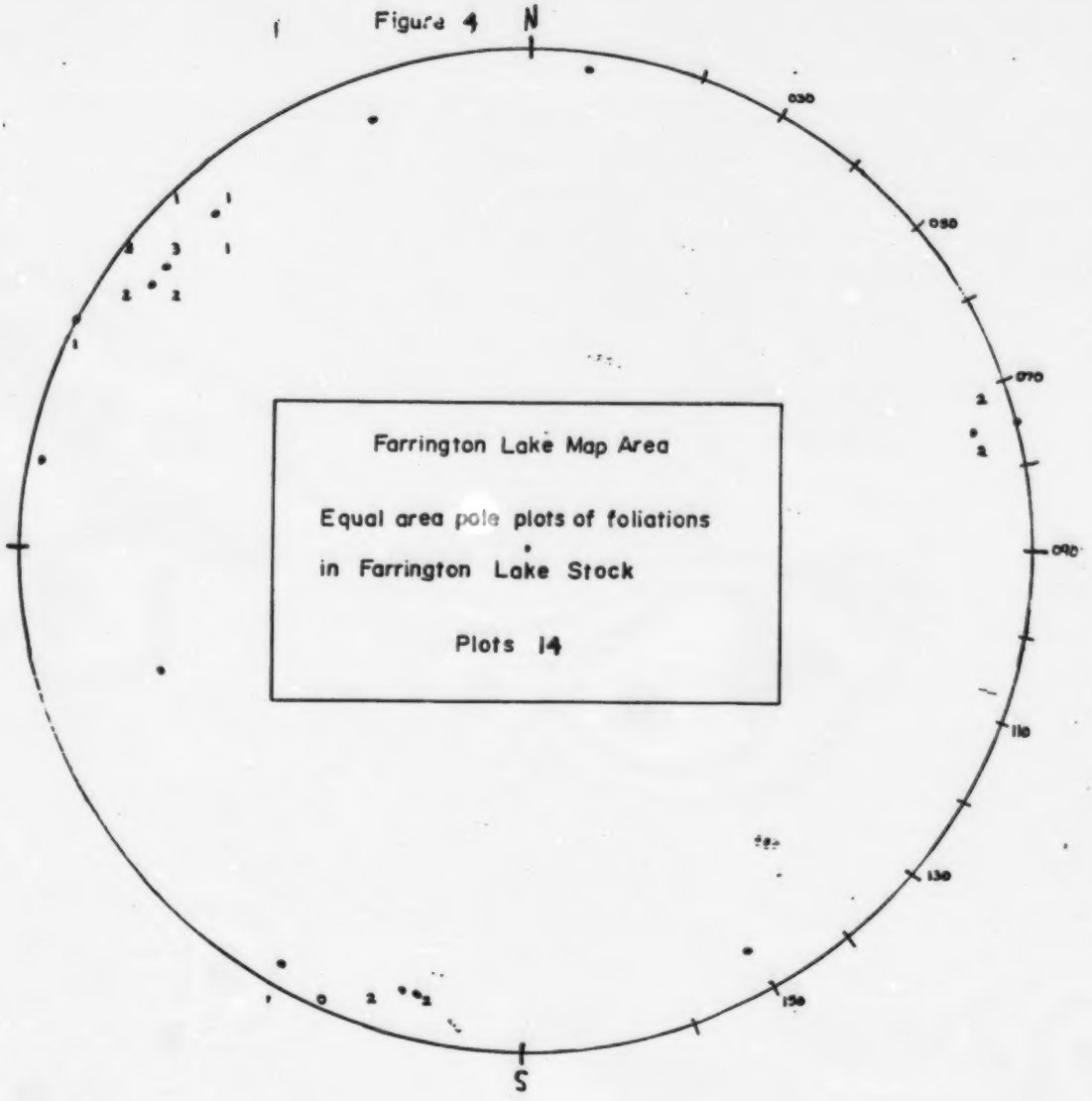

N
030
050
070
090
110
130
150
S
Farrington Lake Map Area
Equal area pole plots of foliations
in Farrington Lake Stock
Plots 14

Figure 5

Farrington Lake Map Area

Equal area net pole plot contours of all foliations in All Supracrustal Rocks lying between Kashaweogama Lake Fault and Lower Mafic Metavolcanic Unit.

Plots 253 Percent 29

Contours 24, 20, 16, 12, 8, 4

Figure 6

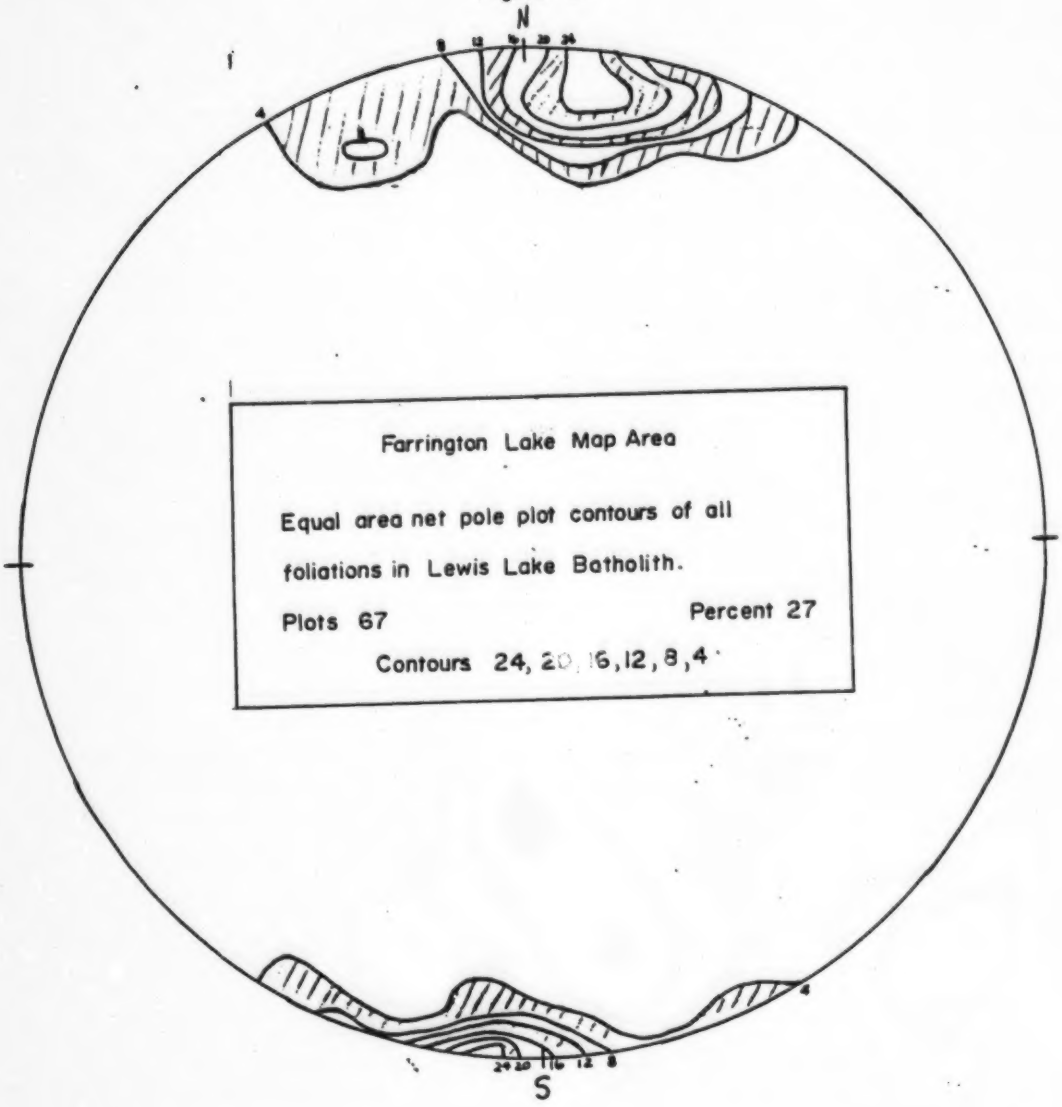

N
S
Farrington Lake Map Area
Equal area net pole plot contours of all foliations in Lewis Lake Batholith.
Plots 67
Percent 27
Contours 24, 20, 16, 12, 8, 4

Figure 7

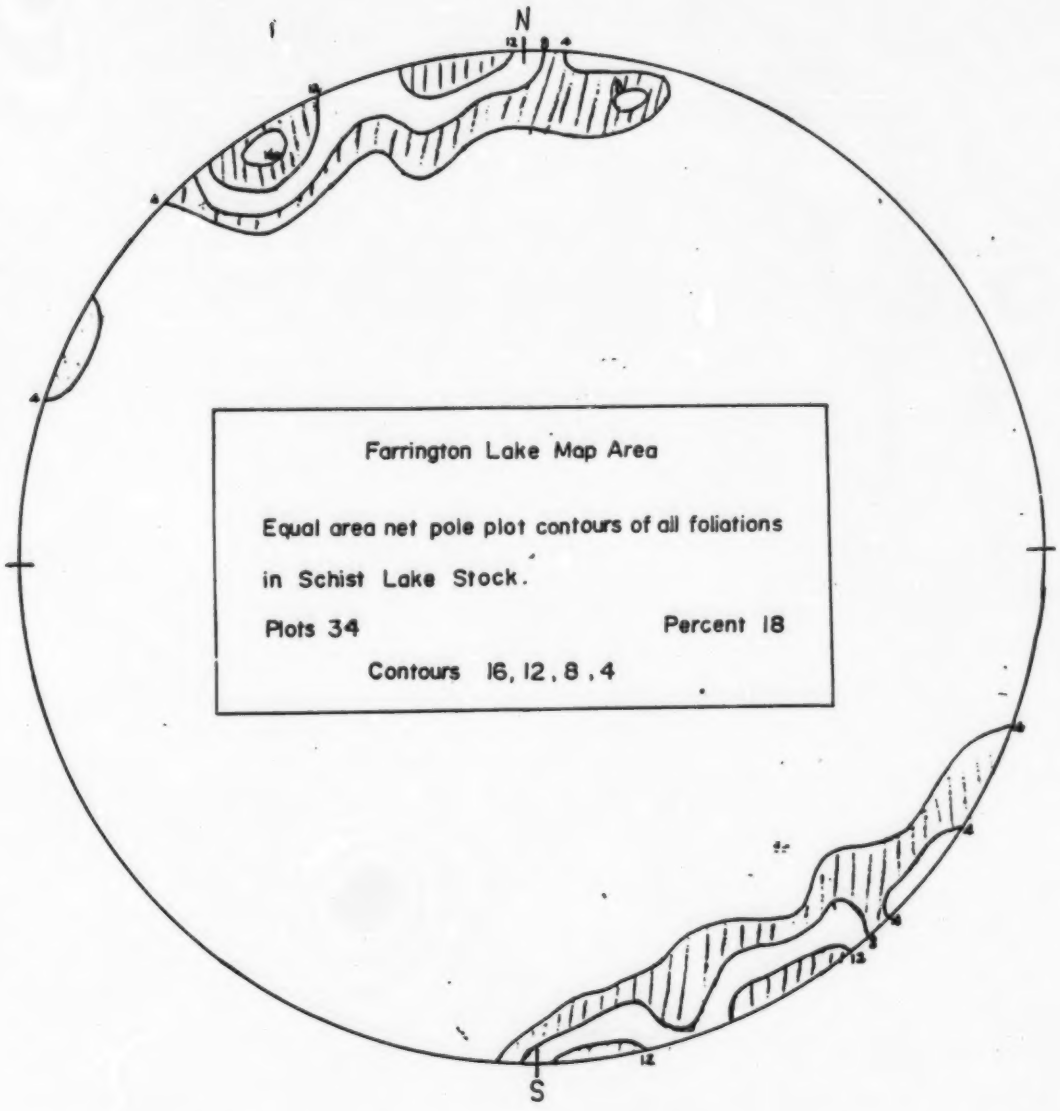

N
S
Farrington Lake Map Area
Equal area net pole plot contours of all foliations
in Schist Lake Stock.
Plots 34
Percent 18
Contours 16, 12, 8, 4

Figure 8

N
S
Farrington Lake Map Area
Equal area net pole plot contours of all foliations in Fairchild Lake Batholith.
Plots 323
Percent 26
Contours 24, 20, 16, 12, 8, 4

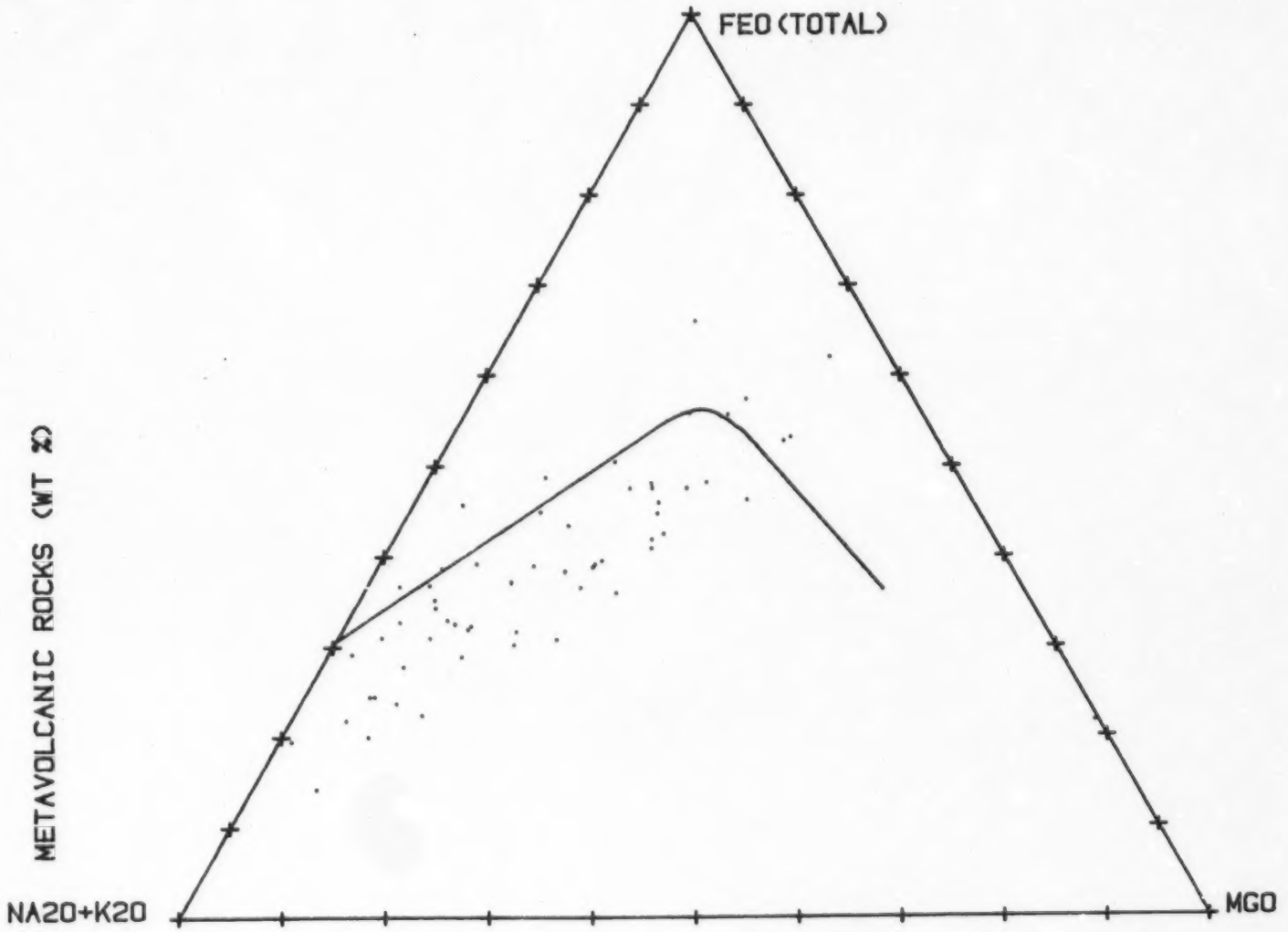


Fig 9 AFM Plot of all Metavolcanic Analyses

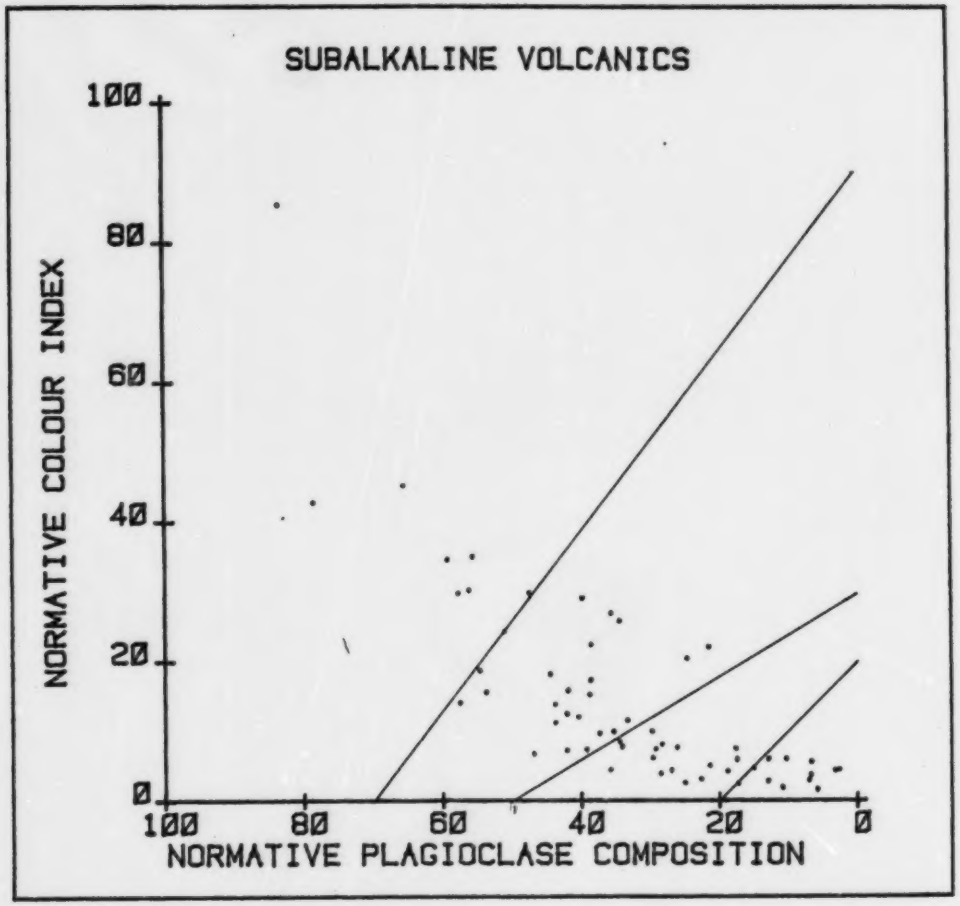


Fig 10 Normative Colour Index vs Plagioclase Composition for all Metavolcanic Rocks

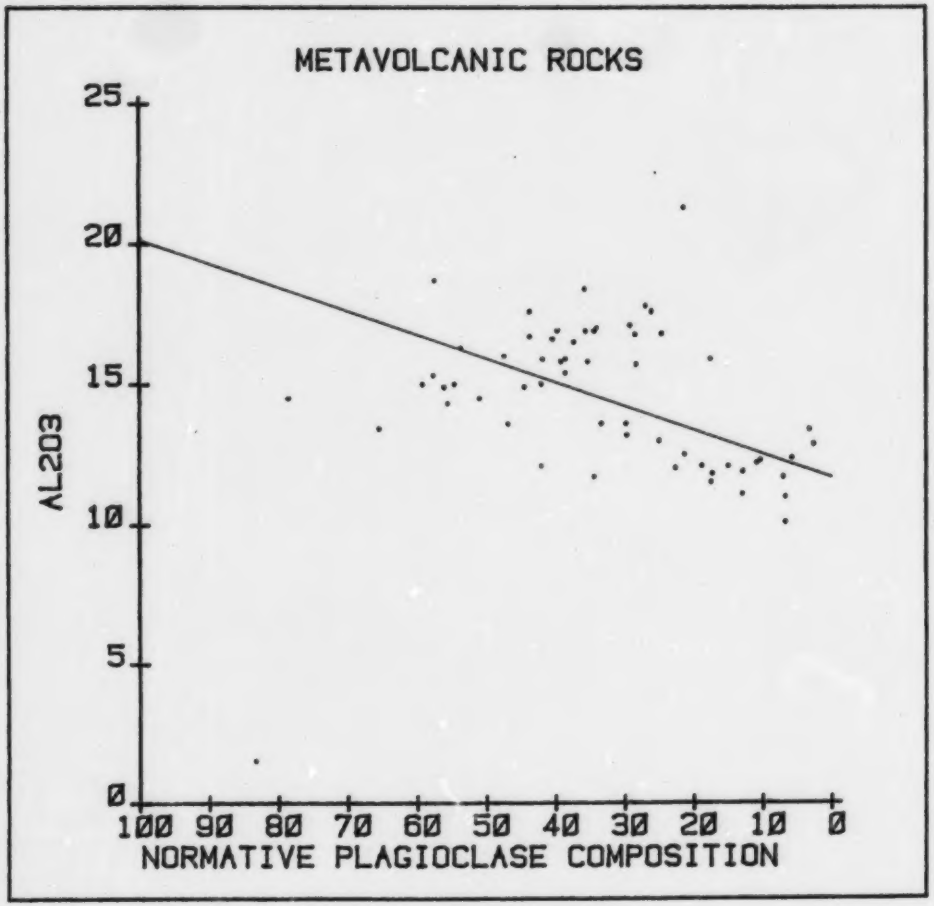


Fig 11 Alumina vs Normative Plagioclase Composition for all Metavolcanic Rocks.

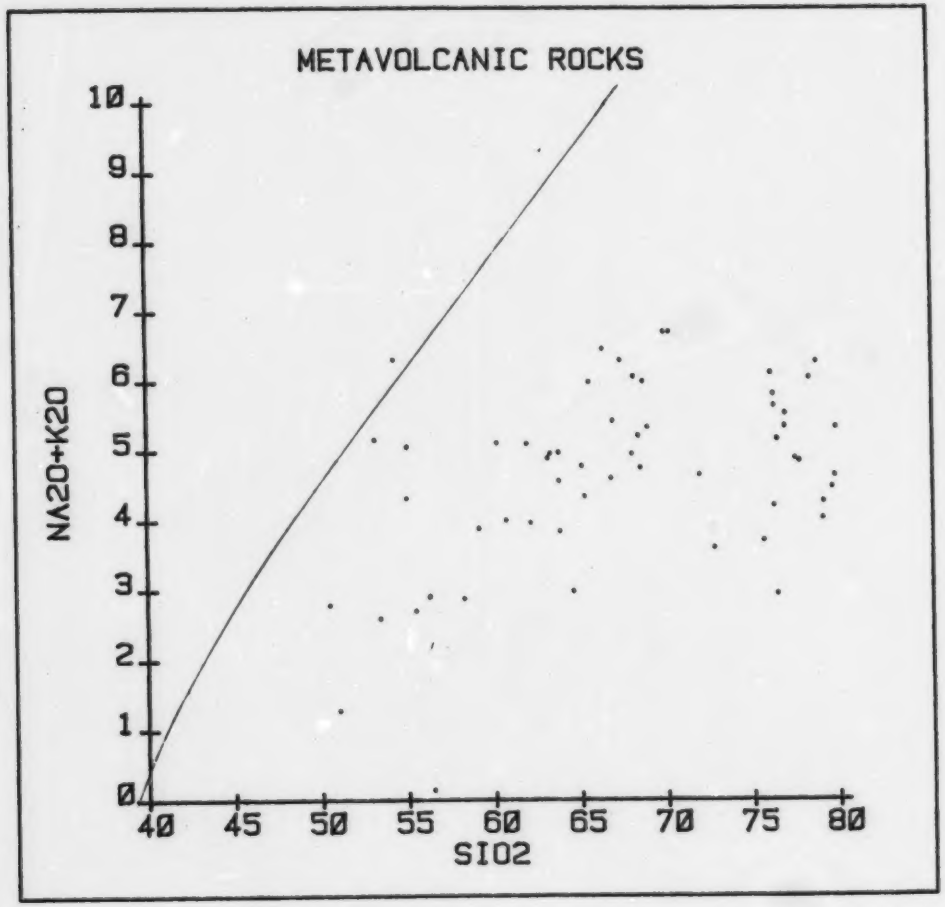


Fig 12 Alkali vs Silica Plot for all Metavolcanic Rocks.

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TABLE 3 : ANALYSES OF NORTHERN MAFIC METAVOLCANIC UNIT, UPPER METAVOLCANIC SEQUENCE; ONE ANALYSIS OF ULTRAMAFIC ROCK

Chemical Analyses, Major Components in Weight Percent

Sample No.	40025	40033	40108	40115	81
SiO_2	57.9	51.1	49.6	46.7	59.3
Al_2O_3	14.5	14.9	13.4	14.5	1.50
Fe_2O_3	2.87	3.01	6.60	13.9	2.51
FeO	5.84	8.36	6.48	.00	4.95
MgO	3.87	2.88	7.41	6.50	26.0
CaO	6.76	8.62	8.30	8.80	.90
Na_2O	2.86	2.48	1.70	1.05	.08
K_2O	.00	.34	.00	.12	.05
TiO_2	1.36	1.26	.98	1.10	.10
P_2O_5	.27	.09	.07	.00	.00
S	.01	.14	.02	.00	.02
MnO	.15	.19	.21	.00	.13
CO_2	1.80	4.60	1.60	.00	1.70
H_2O^+	.79	2.80	3.18	.00	4.53
H_2O^-	.40	.45	.37	.00	.32
TOTAL	99.4	101.2	99.9	92.7	98.1

Trace Element Analyses in Parts Per Million (ppm)

Ag	1	1	1	1
Ba	60	100	50	60
Be	1	1	1	1
Co	25	55	50	85
Cr	110	260	120	560
Cu	160	100	210	10
Ga	15	20	10	20
Li	10	10	6	3
Mo	1	1	1	1
Ni	50	140	60	940
Pb	40	40	10	15
Sc	30	70	70	5
Sn	4	4	1	2
Sr	300	200	100	10
V	200	350	300	4
Y	25	15	10	10

Ga	--	--			
Li	10	10	6		3
Mo	1	1	1		1
Ni	50	140	60		940
Pb	40	40	10		15
Sc	30	70	70		5
Sn	4	4	1		2
Sr	300	200	100		10
V	200	350	300		4
Y	25	15	10		10
Zn	120	160	160		90
Zr	200	70	40		20

Molecular Norms					
Quartz	19.573	10.923	6.634	7.125	9.623
Orthoclase	.000	2.212	.000	.795	.309
Albite	27.183	24.496	16.475	10.560	.751
Anorthite	28.303	31.386	31.239	38.653	3.751
Diopside	2.840	5.497	6.233	4.853	.663
Hedenbergite	1.429	6.522	3.945	3.356	.072
Enstatite	9.980	5.999	18.065	17.674	74.725
Ferrosilite	4.975	7.117	12.004	12.221	8.138
Magnetite	3.165	3.175	2.799	3.045	1.749
Ilmenite	2.006	1.931	1.474	1.717	.146
Apatite	.598	.207	.158	.000	.000
Pyrrhotite	.037	.535	.075	.000	.073

Normative Plagioclase Compositions	51.01	56.16	65.47	28.54	83.32

Description and Location of Analysed Samples

Sample Number	Description	Location Longitude	Location Latitude
40025	Dark grey, feldspar porphyry tuff	91°08'45"W	50°21'51"N
40033	Dark green-grey, mafic tuff	90°57'55"W	50°22'31"N
40108	Pale green, fine-to-medium grained volcanic flow	91°00'05"W	50°22'23"N
40115	Fine-grained mafic tuff	90°58'00"W	50°22'37"N
81	Ultramafic flow	90°57'30"W	50°23'42"N

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TABLE 4 : ANALYSES OF MAFIC METAVOLCANICS OF UPPER METAVOLCANIC SEQUENCE

Chemical Analyses, Major Components in Weight Percent

Sample No.	40022A	40022B	40041	40210	40303	40382A	40386
SiO_2	52.6	52.6	53.8	57.8	49.8	53.1	54.8
Al_2O_3	15.0	14.3	16.0	15.9	16.9	15.3	16.9
Fe_2O_3	10.8	10.7	11.7	6.60	9.50	2.10	1.96
FeO	.00	.00	.00	.00	.00	7.22	6.16
MgO	6.00	5.90	4.10	3.70	4.80	4.20	3.70
CaO	7.70	7.30	7.40	6.80	8.10	8.20	8.10
Na_2O	2.29	2.43	3.24	4.04	4.26	2.48	4.80
K_2O	.27	.29	.99	.87	.58	.10	.24
TiO_2	1.00	.80	1.50	.70	.70	1.07	1.16
P_2O_5	.00	.00	.00	.00	.00	.18	.22
S	.00	.00	.00	.00	.00	.00	.01
MnO	.00	.00	.00	.00	.00	.23	.08
CO_2	.00	.00	.00	.00	.00	2.64	.62
H_2H+	.00	.00	.00	.00	.00	2.21	.27
H_2O^-	.00	.00	.00	.00	.00	.42	.58
TOTAL	95.7	94.3	98.7	96.4	94.4	99.5	99.6

Trace Element Analyses in Parts Per Million (ppm)

Ag	1	1
Ba	60	60
Be	1	1
Co	30	20
Cr	60	20
Cu	45	5
Ga	20	20
Li	10	3
Mo	1	1
Ni	85	50
Pb	100	20
Sc	20	20
Sn	9	10
Sr	300	100
V	150	150
Y	10	15
Zn	80	40

Sr						300	100
V						150	150
Y						10	15
Zn						80	40
Zr						70	150
Molecular Norms							
Quartz	9.940	10.019	6.089	10.901	.000	12.320	3.130
Orthoclase	1.705	1.855	6.068	5.353	3.634	.639	1.442
Albite	21.949	23.601	30.148	37.736	40.512	24.067	43.772
Anorthite	31.878	29.492	27.149	23.603	26.784	32.783	24.243
Diopside	4.724	4.997	5.136	6.791	7.876	4.560	7.325
Hedenbergite	2.405	2.758	3.599	2.410	4.756	3.379	4.770
Enstatite	15.321	15.122	9.168	7.231	3.805	10.253	6.712
Ferrosilite	7.802	8.348	6.437	2.566	2.297	7.597	4.371
Forsterlite	.000	.000	.000	.000	4.281	.000	.000
Fayalite	.000	.000	.000	.000	2.585	.000	.000
Magnetite	2.790	2.601	3.251	2.393	2.436	2.373	2.081
Ilmenite	1.487	1.206	2.166	1.015	1.033	1.611	1.641
Apatite	.000	.000	.000	.000	.000	.407	.468
Pyrrhotite	.000	.000	.000	.000	.000	.000	.035
Normative Plagioclase Composition	59.222	55.55	47.38	38.48	39.80	57.67	35.64

Description and location of Analysed Samples

Sample Number	Rock Description	Location Longitude	Latitude
40022A	Dark green-grey feldspar porphyry	91°08'25"W	50°21'45"N
40022B	Dark green-grey feldspar porphyry	91°08'25"W	50°21'45"N
40041	Dark grey, medium-grained mafic volcanic flow	90°57'50"W	50°19'50"N
40210	Medium green, finer-to medium grained mafic volcanic flow.	91°06'59"W	50°21'25"N
40303	Fine-grained, mafic volcanic flow.	91°13'38"W	50°21'37"N
40382A	Mafic tuff	91°12'18"W	50°21'45"N
40386	Fine-grained mafic volcanic flow	91°22'28"W	50°21'50"N

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Chemical Analyses, Major Components in Weight Percent

Sample No:	40384B	40404	40417	44017	44052	44143
SI02	52.4 A	45.8 A	47.7 A	51.5 A	50.0 A	51.8 A
AL203	17.0 A	14.1 A	15.3 A	18.2 A	24.2 A	17.1 A
FE203	2.52 A	3.00 A	3.46 A	1.44 A	.71 A	2.10 A
FEO	7.64 C	12.4 C	7.87 C	6.90 C	3.41 C	7.46 C
MGO	4.60 A	8.90 A	8.00 A	8.40 A	5.00 A	5.50 A
CAO	8.00 A	9.10 A	11.6 A	8.50 A	13.0 A	7.80 A
NA2	2.67 C	1.13C	1.70 C	2.86 C	2.65 C	4.64 C
K20	.17 C	.19 C	.27 C	.19 C	.17 C	.41 C
TI02	1.07 A	1.26 A	1.46 A	.30 A	.29 A	.97 A
P205	.21 C	.09 C	.04 C	.03 C	.03 C	.18 C
S	.02 C	.17 C	.16 C	.12 C	.02 C	.02 C
MNO	.19 A	.24 A	.16 A	.14 A	.06 A	.17 A
CO2	.73 C	.25 C	.12 C	.14 C	.12 C	.17 C
H20+	1.79 C	2.07 C	1.15 C	.77 C	.44 C	.87 C
H20-	.44 C	.47 C	.37 C	.32 C	.25 C	.25 C
TOTAL:	100.0	999.2	99.4	99.6	100.6	99.4

Trace Element Analyses in Parts Per Million (ppm)

AG	1S	1S	1S	1S	1S	1S
AU						
AS						
BA	70A	60A	80A	70A	60A	100A
BL	1S	1S	1S	1S	1S	1S
BT						
CO	30A	55A	50A	45A	20A	30A
CR	50A	190A	110A	160A	180A	60A
CN	95A	230A	200A	240A	15A	6A
GA	20S	15S	15S	20S	20S	20S
HG						
LI	8A	10A	5A	4A	4A	9A
MN						
MO	1S	1S	1S	1S	1S	1S
NB						
NI	80A	80A	180A	220A	110A	110A
PB	20A	25A	20A	25A	20A	20A
RB						
SB						
SC	25S	45S	35S	20S	15S	30S
SN	15S	3S	20S	20S	10S	10S
SR	300S	10S	100S	300S	300S	200S
IL						
V	150S	250S	200S	50S	50S	150S
Y	15S	10S	10S	10S	10S	15S
ZN	160A	140A	70A	95A	35A	80A
ZR	70S	30S	30S	20S	10S	20S

Molecular Norms

AP	.460	.199	.087	.063	.062	.381
PO	.073	.625	.574	.418	.069	.070
IL	1.559	1.857	2.102	.419	.401	1.365
OR	1.052	1.189	1.650	1.128	.999	2.449

MO	15	15	15	15	15	15
NB						
NI	80A	80A	180A	220A	110A	110A
PB	20A	25A	20A	25A	20A	20A
RB						
SB						
SC	25S	45S	35S	20S	15S	30S
SN	15S	3S	20S	20S	10S	10S
SR	300S	10S	100S	300S	300S	200S
IL						
V	150S	250S	200S	50S	50S	150S
Y	15S	10S	10S	10S	10S	15S
ZN	160A	140A	70A	95A	35A	80A
ZR	70S	30S	30S	20S	10S	20S

Molecular Norms

AP	.460	.199	.087	.063	.062	.381
PO	.073	.625	.574	.418	.069	.070
IL	1.559	1.857	2.102	.419	.401	1.365
OR	1.052	1.189	1.650	1.128	.999	2.449
AB	25.073	10.735	15.772	25.760	18.286	42.070
AN	35.667	334.756	34.441	36.396	55.978	24.872
C	.000	.000	.000	.000	.000	.000
AC	.000	.000	.000	.000	.000	.000
"T	2.755	3.053	3.108	1.511	.737	2.217
HY	.000	.000	.000	.000	.000	.000
WO	.000	.000	.000	.000	.000	.000
EN	12.193	22.958	15.655	21.900	10.110	4.515
FS	8.466	14.631	6.020	8.570	3.232	2.658
Q	9.210	.068	.674	.036	.629	.000
DI	2.179	6.059	14.315	2.722	7.192	6.558
FO	.000	.000	.000	.000	.000	5.655
FA	.000	.000	.000	.000	.000	3.329
NE	.000	.000	.000	.000	.000	.000
LC	.000	.000	.000	.000	.000	.000
KP	.000	.000	.000	.000	.000	.000
HE	11513	3.860	5.502	1.065	2.297	3.861
CC	.000	.000	.000	.000	.000	.000
DU	.000	.000	.000	.000	.000	.000
NS	.000	.000	.000	.000	.000	.000
KS	.000	.000	.000	.000	.000	.000
CR	.000	.000	.000	.000	.000	.000
LN	.000	.000	.000	.000	.000	.000

Normative Plagioclase Composition	58.58	76.40	68.59	58.55	75.38	37.15

Sample No:	Rock Description	Location Longitude	Latitude
40384B	Gabbro	91°11'20"W	50°21'55"N
40404	Coarse-grained gabbro	91°01'14"W	50°19'35"N
40417	Very coarse grained gabbro	91°01'33"W	50°18'57"N
44018	Gabbro	91°00'55"W	50°19'10"N
44052	Coarse-grained gabbro	90°59'42"W	50°19'27"N
44143	Gabbro	91°12'40"W	50°21'40"N